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**Evaluating the Web Usability – An Interpretive Study of the
Bazar portal in Oslo Public Library,
Norway**

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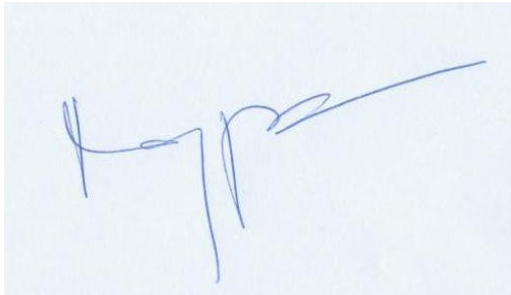
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DECLARATION

I certify that all material in this dissertation which is not my own work has been identified and that no material is included for which a degree has previously been conferred upon me.

A handwritten signature in blue ink, appearing to be 'Nga Quynh Nguyen', written on a light blue background.

Nga Quynh Nguyen (signature of candidate)

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ABSTRACT

The vast pool of information and the development of technology have given thousands of choices for users when using Internet for searching purposes. With all available websites and the diverse set of user skills, website usability is the factor that motivates users to choose one site over another. Hence, usability is needs to be in consideration when designing the website. Understood that such studies are critical to the success of website, this research focuses on evaluation of the usability of the Bazar portal (the information portal of Oslo public library) by investigating the usability problems of the portal and draw out a recommendation to support the current construction process of Bazar. These sole objectives of this study are to make Bazar most effective to the users.

In order to investigate these problems, a task based survey was conducted with 37 participants comprising 2 groups: students and job seekers with different searching experiences. The research indicates that there are numbers of usability problems in Bazar portal. These problems are identified in portal design, organization system, searching system, labeling system and language support. The findings also indicate out that in evaluation by students and job seeker groups resemble each other. Interestingly, the less experienced group and the more experienced group have different points of view in evaluating portal usability.

The findings from this study have practical implications for website designers in their process of designing the new version of Bazar. Furthermore, the results indicate that language is an important factor in multilingual portal; therefore more effort should be devoted to this factor in supporting in reading, understanding and using information.

Keywords: Web usability, usability key factor, web design, usability evaluation.

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CHAPTER 1: INTRODUCTION

This introductory chapter outlines the motivation for this research project. First, the background of the research is presented. Next, the research problem is stated. The research questions, hypotheses, justification for the research and methodology used in the study are then discussed, followed by definitions and limitations of the research project. Finally, an outline of the thesis is given.

1.1 Background

Advances in Web technology have provided more choices in the delivery of and access to information resources. For library and information professionals, Web technologies have been exploited effectively to offer a wide range of resources and services. People are enabled to access information effectively via information portals, which are sites that provide users many channels to access online information, use information related services such as searching, community building features, commerce offerings, personal productivity applications, communication of the site owner and peer users' (Eisenmann & Pothen, 2000).

However, previous studies show that there was a lack of concern in Web usability when designing website, which caused website failures (Becker and Mottay, 2001). The ISO 9241-11 standard defines the term 'usability' as 'the extent to which a product can be used by specific users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use' (as cited by Green, 2006). Therefore, it is critical to take issues of usability into account in the development of an information portal to maximize its benefits in providing information to users.

1.2 Statement of the Problem

Oslo Public Library (Deichmanske bibliotek) has been funded by the government through 'Norwegian Archive, Library and Museum Authority' (ABM-utviklingen) to develop a tool enabling libraries around Norway to make their own portals. Oslo Public Library is now in the process of developing open standard based software for creating topic-centered portals. The multilingual library is planning to use this tool for the new multilingual site called Bazar.

Bazar is a project situated at the multilingual library – a department of Oslo public library. Bazar was created mainly to support and provide useful and practical information to immigrants and refugees. By collecting web pages around the world, this portal provides information about: labor, housing market, Norwegian language courses, family reunification, integration, Norwegian history, health, newspapers and books, etc. all over the world. The structure of Bazar is strictly hierarchical. Over the years Bazar has grown into a large portal. It has become increasingly difficult to find particular information in the portal.

Therefore, it is necessary to re-design Bazar and use cutting-edge tools that can help address the needs of users. Content findability, friendly interface, efficient content management and identifying of the various user needs are some of the basic demands from both sides of librarians and also users.

Oslo public library has made a lot of efforts into building up a portal presenting all necessary information for people who are already in -- or coming to -- Norway. However, the current version of the portal is now out-of-date with respect to the content, and the interface has some weaknesses that need to be improved to ease users' operations. While the construction of the new version is being carried on, unfortunately, there have been no studies on the usability of Bazar: How easy it is for users to use? How well it supports users in searching and browsing information? How and what to improve to maximize the usability?

Understood that such studies are critical to the success of the reconstruction of Bazar, this thesis focuses on evaluation of the usability of Bazar. In particular, firstly, it investigates on different aspects of evaluating the usability of an information portal in general. Secondly, it applies the evaluation model, identified in the first step, to support the current construction process of Bazar. The sole objective of this study is to make Bazar more effective to the users.

1.3 Research Questions / Hypothesis

1.3.1 Research questions

This study aims to answer the following questions

- RQ 1. What usability problems do users experience when using Bazar during their information seeking process?
- RQ 2. Is there any difference between less experienced users and more experienced users in their usability problems?

1.3.2 Hypotheses

The following hypotheses were made for the study. It was assumed that during the information seeking process, respondents all have problems in:

H1. Portal appearance

H2. Portal organizational structure

H3. Portal accessibility support tools

H4. Portal navigation

H5. Portal label system

H6. Portal supportive function

Based on the characteristics of respondents: which are student and job seeker, and less experience and more experience, further hypothesis were made as follows:

H7. Student group experiences different problems than job seeker group.

H8. Less experience group experiences more problems than more experience group.

1.4 Methodology

The survey research and modified experimental with hypothesis testing are used, employing a task-based online questionnaire as the data collection method. The questionnaire consists of both closed and open-ended questions to provide both quantitative and qualitative data. A descriptive analysis (also called descriptive statistics) (Pickard, 2007) has been applied to the quantitative data, while the qualitative data will be analyzed using content analysis. Chapter 3,

which is about research methodology, will discuss the methodology used and justifications for it in this research in details.

1.5 Definitions

1.5.1 Usability and Web usability

In the last decades, the term usability has been used in many different areas, making it a confusing concept. There are not only many general concepts, but also specific ones in a particular area. The reason derived from the fact that there are different viewpoints, which have led to different definitions of usability in literature. Not an exception, there are many specific concepts of website usability in digital environment. In our context, we consider the usability of a website. Hence, the term usability and website usability are used interchangeably.

In general, Web usability was defined as the ability of people who use the product to accomplish their own tasks in a quick and easy way. (Webcredible, 2010). The ease of use to achieve the final goal is also the common definition for usability in system design, which has been used as a main attribute for many authors when building their own understandings for usability (Keeker, 1997; IEEE, 1990; Marcus, 1999; Wikipedia; Bevan, 1999; Agarwal and Venkatesh, 2002; Nielsen, 2000; Karat and Karat, 2003, Tarafdar and Zhang, 2005).

Along with the above definitions, there was another widely accepted approach to define the usability concept based on quality components. Nielsen defined usability as ‘a quality attribute that assesses how easy user interfaces are to use’. According to this author, usability is defined by five quality components:

- **Learnability:** how easy is it for users to accomplish basic tasks the first time they visit the webpage.
- **Efficiency:** how quickly users can perform tasks after getting used to the design and organization structure of the website.
- **Memorability:** how easily users can reestablish their proficiency after a period of time not using the website.

- Errors: How many errors do users make, how severe are these errors, and how easily they can recover from the errors.
- Satisfaction: How pleasant it is to use the design.

This definition has many supporters. As cited by Green (2006) Seffah and Metzker pointed out usability as a set of quality attributes such as user performance, satisfaction, and learnability, or a combination of all those factors. Marcus (1999) identified usability as the ease and efficiency of a product that enable user to recognize, learn, remember, use, and enjoy. Effectiveness, efficiency and satisfaction in a specified context of use are also the quality dimensions for usability, which was defined by the ISO 924111 standard (as cited by Green, 2006).

Quesenbery (2003) supported Nielsen's definition of Web usability as well as the ISO 924111 by developing five dimensions, which can be used in a website setting as well as for software development. Quesenbery's five dimensions of usability include effectiveness, efficiency, engagement, error tolerance, and ease of learning.

Another approach to quality dimensions of usability is of Bevan (1999) who defined website usability by different dimensions including understandability, learnability, and operability. In ISO 91261 and Electrical and Electronics Engineers (IEEE, 1990), usable is considered as how easy for user to learn to operate, prepare inputs for, and interpret outputs of a system or components.

1.5.2 Web portal

The term 'Web portal' has been used in a variety of ways. In general, it has been used to characterize websites commonly known for searching and navigation tools. Around 1996, a portal was known as the place where information on Internet was cataloged into different categories, performs as a hub where user could locate their desired information (Michalko, 2005).

In the early studies, as cited by Manouselis and Sampson (2004) Komoroski, McKellar, & Gair and Meehan defined that Web portal is the place providing a single point of access to information. Also considering Web portal as a gateway to information, Meisel and Sullivan (2000) defined portal based on its functions. A portal could be seen as a filter tool to make it easy and convenient for users in searching progress. The information has been selected

carefully and well organized, and will be listed out the most relevant and valuable information. Therefore, it is very helpful in supporting decision-making process of users. This also plays its best role in saving users' time and effort in their information retrieval process.

Having the same idea, Winkler (2001) pointed out that the term Web portal was used to refer to internet search and navigation sites that provide a starting point for Web visitors to explore and access information on the World Wide Web. The term 'Internet portal' or 'Web portal' began to be used to describe such mega-sites in which users are able to browse an organized hierarchy of categories developed by people who the Internet for relevant and useful websites.

When finding a flexible evaluation framework for Web portals based on multi-criteria analysis, Manouselis and Sampson (2004, p.536) defined Web portals as websites that focus, to an extended degree, on a blend of the four features:

- Content (in terms of contained information or access to external information resources)
- Design (in terms of providing users with a pleasant, usable, and stable environment)
- Personalization capabilities (in terms of serving users' specific preferences and needs)
- Support to the formulation of virtual communities of users (in terms of bringing together users with similar interests and needs)

As cited by Michalko (2005), Looney and Lyman defined the Web portal as a system which provides a variety of useful information resources into a single one stop webpage to help users avoid being overwhelmed by 'info glut' or feeling lost on the Web.

In a recent research, Simonsen (2009) specified the definition of Web portals into one kind named corporate information portal whose definition was 'a data warehouse-based tool, which offers specific employees fast and easy access to relevant data from specially selected data repositories, compiled and designed to satisfy the corporate information needs in question'. (p.201)

After evaluating the potential functions of portal, Simonsen concluded that the corporate information portal satisfied different specific types of corporation information needs and can be considered as an efficient tool supporting for users' searching information process.

Over the years, the definition of the Web portal and information portal seems to have converged. In a most general view, Web portal is considered as a tool to access the right information in a most convenient way (Meisel and Sullivan, 2000).

1.6 Limitations and Scope

The following limitations and scope are applied to this study:

- Only Vietnamese participants are included in the target groups surveyed.
- Participants' educational level was undergraduate and postgraduate.
- Only two groups are included: students and job seekers.
- IP addresses are needed for log analysis but some of them are dynamic. Therefore their log cannot be recognized.

1.7 Thesis Outline

The first chapter provides motivation for this research project by firstly presenting background information. The research questions and hypotheses are stated along with the aims of the study. Finally, definitions and limitations are mentioned.

Chapter 2 reviews the literature. Web usability criteria have been identified; and finally the discussion about the criteria to be used in the Bazar Web portal is presented.

The third chapter outlines the methodology used in this research and provides justification for the choice. Sources of data, data collection instrument, questionnaire distribution and methods for analysis are also described.

Chapter 4 comprises the data analysis and discussion. This falls into three main categories: analysis of all the responses; comparison between these two groups in experiencing usability problems, and discussion about findings.

The final chapter presents conclusions on lessons learnt, and recommendations for improvement. It also suggests some directions for further researches.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

As one of the most significant factors in evaluating website quality, usability is a concept that many researchers have devoted much time and effort to study. The general question is how to make a website more usable and as easy as possible for users to browse. (Hong, et al, 2002, Manouselis and Sampson, 2004, Tarafdar and Zhang, 2005).

According to Tarafdar and Zhang (2005) website usability plays a vital role in attracting customers to visit, as well as to perform online transactions. A poor design with low usability tends to result in discouragement of revisiting and doing business from users. Although millions of dollars have been spent on building 'usable' systems, research on digital libraries has shown that potential users are still not able to use the systems effectively in spite of their availability (Hong et. al., 2002).

The development of information technology and the information explosion have had strong impact on designing and organizing information with the aim of serving digital library users, to make them able to retrieve information efficiently. Therefore, to cope with this situation, many website developers and librarians nowadays are expected to create a website in a consistent style and easy to use.

Librarians and Web designers now are thus faced with challenges of how to organize and design a website in the most easily usable and understandable way to make information available as much as possible to all kinds of audience. In consequence, determining how to design a website in such a way that best suits user in browsing and retrieving the appropriate information has been determined with a high priority. However, it is not easy to establish criteria for evaluating usability. In order to perform the evaluation, several issues should be considered, including the criteria to be used for the evaluation. Although there is a large amount of research on website usability designers and evaluators can refer to, each study varies in terms of coverage, clarity, context, suitability, quality, and comprehensiveness.

With the above discussion, this literature review aims to explore the literature on various aspects of the key factors that have strong effects on the usability of websites, includes specifying the role of each factor and determining criteria for each factor that should be taken into consideration when evaluating websites.

2.2 Methodology

The technique used (in this literature review) was: searching for relevant articles from many reliable databases, books from library and online database as well, other internet sources for choosing the most relevant ones, and analyzing them. The search was carried out on many databases: Emerald, LISTA, ScienceDirect, Springer Link, IEEE and Google Scholar.

The search includes the following keywords: 'Web usability', 'usability key factor' 'Web design', 'user study' 'usability criteria', 'information architecture'. The initial selection comprises of articles, books, website, and reports. From these resources, documents have been reviewed in detail.

2.3 Key factors of Web usability

As Web usability has emerged as one of the principal factors that influence the success of a website, in the last years, many researchers have made a lot of efforts in order to establish the factors affecting the success of Web usability. However, there is no agreement on a well-defined set of usability criterion. Generally, usability is primarily related to the design aspects of webpages that make sense to people. It not only allows users to navigate easily and conveniently, but also helps them find the relevant information (Hassan and Li, 2001, Tarafdar and Zhang, 2005)

There are different frameworks for Web usability dimensions:

Table 1: Web usability elements from previous studies

No	Usability factors	Schneider, 1998	Nielsen, 2000	Palmer, 2002	Cox&Dale, 2002	Agarwal & Venkatesk, 2002	Richard, 2005	Zvirant, 2006	Pearson and Green, 2007	Nathan & Yeow, 2008
1	Accessibility								x	
2	Clicks				x					
3	Color				x					
4	Consistency				x					
5	Content	x	x	x		x	x			
6	Credibility	x	x							
7	Customization and personalization								x	
8	Download delay/ Response time	x	x	x					x	x
9	Ease of use					x			x	
10	Emotional response					x				
11	Entertainment						x			
12	Flexibility				x					
13	Graphic				x					x
14	Interactivity			x						x
15	Links				x					
16	Made for medium					x				
17	Menu				x					
18	Navigation	x	x	x			x	x	x	x
19	Organization						x			
20	Promotion					x				
21	Responsiveness			x						
22	Screen				x					
23	Search				x			x		
24	Text				x					x
25	Trustworthiness									x
26	Clarity of goal									x

Which factors contribute to a 'usable' website interface is still an open topic for discussion. Reasonably they depend on the expectation and target users of the particular site. There are many factors that have their own influences to the success of a website, each of these is important to the overall impact. In this literature review, these factors will be grouped into 7 main categories:

- Appearance
- Organization
- Accessibility
- Navigability
- Labeling
- Interactivity
- Customization and personalization

2.3.1 Appearance

When bringing up the idea about website appearance, people define it as how appealing and welcoming it looks to them. The appearance of the website is divided into 3 sub categories: space division, scanability, and readability.

Over the years, there have been many studies about the impacts of appearance when designing usable website. It has been found that the consistency of design has its impact on the number of errors, according to this finding; inconsistent displays will cause more errors than consistent displays (Anonymous, 2006)

As stated by Website content guide (2008), visual consistency in appearance includes the size and spacing of characters; labels' color, fonts and backgrounds, labels' location, texts and pictures. It has been observed that, while working with consistent interfaces, users typically produce better results: they needed less time to learn and complete tasks, made fewer errors, and they were also more satisfied. Hence, the following factors should always be considered during the process of designing and evaluating Web usability.

a. Space Division

According to Hassan and Li (2003), space division refers to proper allocation of space for functions and content display provided in a webpage to help users focusing their attention.

In the preliminary design process, page design should be concerned (Website content guide, 2008). In this step, designers must decide whether to create long pages with extensive scrolling or shorter pages with having to move frequently from page to page. In this guide, authors also mention the inconvenience of the horizontal scroll, which should not be used.

Becker and Mottay (2001) refer space division concept as design consistency, defined as the consistent position of page components on the page itself and between different pages. With a consistent design, the users are provided a common look on each page in either single sites or global sites, which makes use of a website more efficient and comfortable. Consistency should be maintained in various components such as textual descriptions, labels, prompts, messages; color stability is also considered for links, background, and text among others.

In general, the literature shows that the designers should ensure the website not only is easy to see, but also that moving from page to page is as efficient as possible.

b. Scanability

Because of time and patience factor, the first thing users tend to do when using any website is scanning for the information that they look for. As a matter of fact, they might easily give up after overall scanning and fail in finding out any related content (Morkes and Nielsen, 1997). Therefore, scanability should be considered as the first element that designer and developer should mention in their process of building a website.

Based on their on-going research on usability, Morkes and Nielsen (1997) stated that instead of reading word by word in the webpage, people usually scan the page and pick out information of interest. In the exploratory research about reading ability when using websites of students, Morkes and Nielsen (1997) have claimed that texts in the website should be scannable because scanning can save users time. During their study, 15 participants always

approached unfamiliar Web content by trying to scan before reading whereas only 3 participants started reading right in the beginning without scanning. They also pointed out headings, large type, bold text, highlighted text, bullet lists, graphics, captions, topic sentences, and tables of contents are essential attributes that enhance scanability. These authors also stated that the website would become tiring and painful to read without scanability.

c. Readability

Readability includes the font type, font size and color used in the website. These factors all affect to the website attraction.

Many guidelines on webpage design have addressed making the content of the website readable (Website content guide, 2008) and Web design and usability guidelines these guidelines emphasized on the use of bold texts to draw an attention from users to the important content, using familiar fonts to make it enjoyable for users to read and browse.

Color is also one factor in website attractiveness, also contributing their influence to the readability to user. It is not only about the color of the text of the website in general, but also about the color used for links, the visited link, subject headings... According to Nielsen, (2002), this is one of the top ten mistakes when designing a website.

2.3.2 Organization

Organization means the way information is categorized. The organization system is also known as taxonomies and hierarchies. As cited by Morville and Rosenfeld (2002), Hayden White stated that classification is the beginning of all understanding. According to these authors, the way information is organized, labeled, and linked to other related information influence the way people understand that information.

As mentioned by Gullkison et al (1999), Wurman defined information structure of a website as 'a structure or map of information which allows others to find their personal paths to knowledge' (p. 294).

According to Lynch and Horton (2002), a good website and page design allow users to understand organizational relationships of the site and support users in locating the related information effectively. A clear and logical structure has a strong effect in reducing the chances of users becoming bored or frustrated.

In the research about the impact of information architecture on academic website usability, Gullkison et al (1999) carried out a usability test with 24 participants using the university website to answer the question from the given tasks. In the final result, they found out that one of the problems causing not retrieving information was unclear structure.

As a result of many findings from other researchers, organization should be put in the evaluation list when assessing the success of any website.

a. Organization Scheme

Organization schemes divide information into well-defined and mutually exclusive sections. There are many ways of organizing information. Morville and Rosenfeld (2002) divided it into 2 sub categories: exact and ambiguous. These logical orders have strong support to the way of searching information of users.

Exact organization scheme is chosen in case user knows exactly what they are going to find, it could be a name, a date. There are 3 types of exact organization schemes, which are alphabetical, chronological, and geographical.

The second scheme is ambiguous organization scheme, applied for grouping information into different categories following topic, task or audience. This scheme is useful for the users who not clearly know what they look for. Hence, it is a terrific start to make groups of information that are suitable for their needs.

b. Organization Structure

Hierarchy

According to Lynch and Horton (2002), hierarchical organization is a vital necessity on the web. Overall, every site has its own hierarchy, in which information is categorized from the more general information into more specific one. This is so called a top-down approach as stated by Morville and Rosenfeld (2002). Both authors agreed that, in information architecture, general categories become high-ranking element and chunks of information are located lower in the hierarchy. As a result, when a logical set of priorities and relations in content outlines has been identified, designers or librarians can, based on that, build a hierarchy following the Top-down approach as mentioned above.

Taxonomy

Taxonomy is described as ‘the science and practice of classification’ (Wikipedia). In information architecture theory, Lynch and Horton (2002) defined it as ‘a hierarchical structure of content categories by using a specific and carefully designed set of descriptive terms’. Taxonomy then will allow users to access the information via a set of names and terms describing the main content categories, key navigation site links and major terms describing the interactive features of the site.

2.3.3 Accessibility

Web accessibility is about making the website accessible to all Internet users. The basic way to achieve this is to ensure that website provide as many supporting tools as possible to help users in retrieving information, regardless of what browsing technology that they are using. According to Hassan and Li (2003), the word 'accessible' means that users are not only able to get a connection to a website but also to browse all available contents. In their study of identifying Web usability criteria, these authors pointed out the degree of accessibility presenting for level of usability.

Morville and Rosenfeld (2002) as well as Pearson, Pearson and Green (2007) identified the importance of findability as a critical success factor for Web usability. The success of a website could be evaluated based on the success of user’s searching information process. If information cannot be found through some combination of browsing and searching, then the site fails.

a. Search function

According to Morville and Rosenfeld (2002), whenever using a website, people tend to expect the search function is available for them to use. Even when the website probably is not large and does not contain much content, but for every website, search engine is the place people look for when getting lost, to others, it is considered as a starting point. Users will not always be willing to browse through a website's structure due to limited time, lack of patience or many other reasons. Many studies found that users expectation is that little search box is available whenever they look for. This can be seen as a default convention, and 'it is hard to stand against the wave of expectations' (Morville and Rosenfeld, 2002, p. 135)

b. Browsing support

Along with searching, browsing support also plays a significant role in helping user to retrieve information in a short and enjoyable way. Indexing is a good tool to support browsing.

According to Morville and Rosenfeld (2002), a website index serves as a way of a back-of-book index. In this part, keywords or phrases are ordered alphabetically and, their actual hierarchical structure is flattened in only one or two levels of depth. It is, therefore, advantageous for experienced users, who already know the items' name they look for. Without being distracted by way the website is organized, users would get to the place where they want to go by a quick scan of the alphabetical listing and follow the links attached to it. By avoiding the hierarchy and relying on users' knowledge, an index provides, especially for small websites, a simple yet sufficient navigational tool.

c. Loading time/download speed

Download speed commonly stays out of scope of most researches as it depends mostly on the underlying infrastructure of the telecommunication. There are many elements on the way from server to browsers, which could affect the download speed. However, from the user's point of view, loading speed is considered an important element of website usability (Palmer, 2002). In their study, Turban and Gehrke (2000) believed that between two websites providing equal contents and services a simple one would always be preferred to the other one, which may contain flashing banner advertisements, overwhelming images and multimedia effects that slow down the opening

time. Tarafdar and Zhang (2005) stated that long time waiting causes dissatisfaction and anxiety for users. Former usability studies pointed out that, a threshold of just a few seconds download delay should always be abode in order to meet user's satisfaction. Becker and Mottay (2001) stated that the response and waiting time is the measure for website performance.

With all above reasons, the speed of access and the availability of the website are also considered as the first order factors for Web quality.

2.3.4 Navigability

Navigability can be considered as one of the most significant factor for Web usability. Many researchers included this factor in the criteria list influencing the success of the website. (Schneiderman, 1998, Turban & Gehrke, 2000; Palmer, 2002, Huang, 2003).

In a previous study, Schneiderman (1998) has compared the ability of users when working with organized and unorganized screen designs. The result pointed out that, the number of navigation errors and the time spent to think when using the unorganized screen were twice as much as when they used the organized design. Turban and Gehrke (2000) showed in their study that a poorly designed navigation system usually leads users to cognitive overload and thus decreases the Website usability.

When developing a measurement for Website usability, Palmer (2002) has built up a list of factors which impacts usability of the website most, one of these factors is navigability. This author defined navigability 'as the sequencing of pages, well organized layout, and consistency of navigation protocols' (p. 155). After doing three studies testing a hypothesis whether more navigable websites will be associated with greater perceived success by site users, he found out that this hypothesis was strongly supported.

A website navigation system is in many ways a road map for the users. A well-designed structure, reasonable grouping of contents and practical navigation tools will lend users a hand to know their current location, visited locations, and where they can go. This is an essential property, which makes the experience of users during browsing a website efficient and enjoyable.

One of the most frequently encountered mistakes during the process of designing website navigation is that, designers tend to build it with their own perspectives, how to find information, how to traverse through the website, but not from the perspectives of users. Therefore, designers should always keep in mind that users are the subjects of this process, and perspectives from users could be totally differently from what the designers expect (Nielsen, 2003). In his experiments, he used two navigation schemes: one built on the mental model characteristics of most users, the other based on the company's internal thinking. The result was that the first model was used nine times more often than the latter one. User-centreness is a fundamental requirement, which comes along with simplicity, efficiency and flexibility to build a good navigation system. A website always needs a good navigation system to serve diverse needs of its users, satisfy them and attract their future comeback.

Navigability factors can be divided as below:

a. Links

As cited by Cox and Dale (2002), many authors stated that valid links are one of the most significant factors of website navigation. These authors also mentioned about some standards for useful links. They are the precision of links to display connection site of page, the minimum number of links to get to the right information and the color change of links to let users know they used them before.

b. Consistency

Consistency of a website not only depends on the layout of the website, but also the procedures for related content which should be present at the same place to make their searching easier (Cox and Dale, 2002). These factors contribute to the ease of the website navigation.

c. Flexibility

Cox and Dale (2002) pointed out that, flexibility is the ability that users can go backward and forward during their browsing process. With this function, people can easily move around the

website without having to go back to the beginning by clicking on the homepage or re-enter the website address to start over.

Accordingly, the factors supporting navigation are shortcuts, location Identification, related content/suggestion links, available function identification, sitemap (Good, 2000, Cox and Dale, 2002, Hassan and Li, 2003).

2.3.5 Labeling

Labeling has been an issue for a long time. Known as a form of representation for concepts and content of information, labels are to represent larger chunks of information in websites. Identifying the importance of labeling in Web usability, Morville and Rosenfeld (2002) stated a label is a bridge between user and provider to communicate information efficiently. Therefore, to minimize the disconnection between provider and user, the labeling system should be seen as the important factor for the designer or the librarians in the library when building their website to ensure the label speaks the same language with a site's users while reflecting its content.

As stated before (Section 2.3.2.1), studies found that most users spend more time scanning rather than reading information on websites, therefore, well-designed headings play a crucial role in helping users to facilitate both scanning and reading written material. According to many researchers, unique and descriptive headings are highly supportive in enabling users to find what they look for (Nielsen, 2000, Anonymous, 2006).

2.3.6 Interactivity/Supportiveness

Interactivity is a fundamental concept of computer-mediated communications (CMC) and makes the key difference to other mediums. Instead of having one-to-many communication, the Web provides users facilities to communicate with them or each other, which is referred to as a many-to-many channel of communication (Fortin and Dholakia, 2005).

There is no unified definition of 'interactivity' as the term is often loosely used and has slightly different meanings. According to Hoffman and Novak (1996) interactivity is separated into two levels: person-interactivity happens between humans through a medium and machine-

interactivity, which refers to the communication between humans and machines. Fortin and Dholakia (2005, p.388) proposed the definition for interactivity as:

'the degree to which a communication system can allow one or more end users to communicate alternatively as senders or receivers with one or many other users or communication devices, either in real time (as in video teleconferencing) or on a store-and-forward basis (as with electronic mail), or to seek and gain access to information on an on-demand basis where the content, timing and sequence of the communication is under control of the end user, as opposed to a broadcast basis.'

In research to identify key metrics that can be used to identify elements of a successful website design, Palmer (2002) found that interactivity is one of the key website capabilities. He also suggested that the successful website could take advantage of this through opportunities for interaction with the site users. The availability of feedback function or Frequent Asked Questions (FAQ) is not only for maintaining a website in the long run but also improving the website quality.

Feedbacks are not only to help a website always updated with users' needs but also to improve other services provided by the website owner. Providing an easy-to-find, simple yet sufficient form of feedback is the direct way to know clients' assessments and their expectation of the website.

According to Gehrke and Tuban (1999), FAQ gives the users an overview of the information provided by a website. It saves time and effort for the site owners, as they do not have to answer the same questions over and over again.

2.3.7 Customization

Customization and personalization, which mean dynamically fitting a site to the user's needs (Agarwal and Venkatesh, 2002; Palmer, 2002), are critical factors in website success. Personalization and customization provides the ability to control the amount of information pushed at users. Recently, Liang et al. have shown that users will be more satisfied when using an interactive website, which can be customized to their own needs. However, they also indicated that, personalization of a website can have drawbacks: too much personalization

results in lower user satisfaction and information overload. In a study involving websites from four different industries, Agarwal and Venkatesh (2002) pointed that personalization was important for websites that were hoping to establish an ongoing relationship with the customer. Despite its advantages, customization and personalization are not yet widely used by large international corporations. In a study by Huang (2003), only 6 percent of the websites owned by such companies supports these features, quite a surprising result in compare to the hypothesized of 50 percent.

2.4 Discussion - Adapting to the case study of Bazar portal

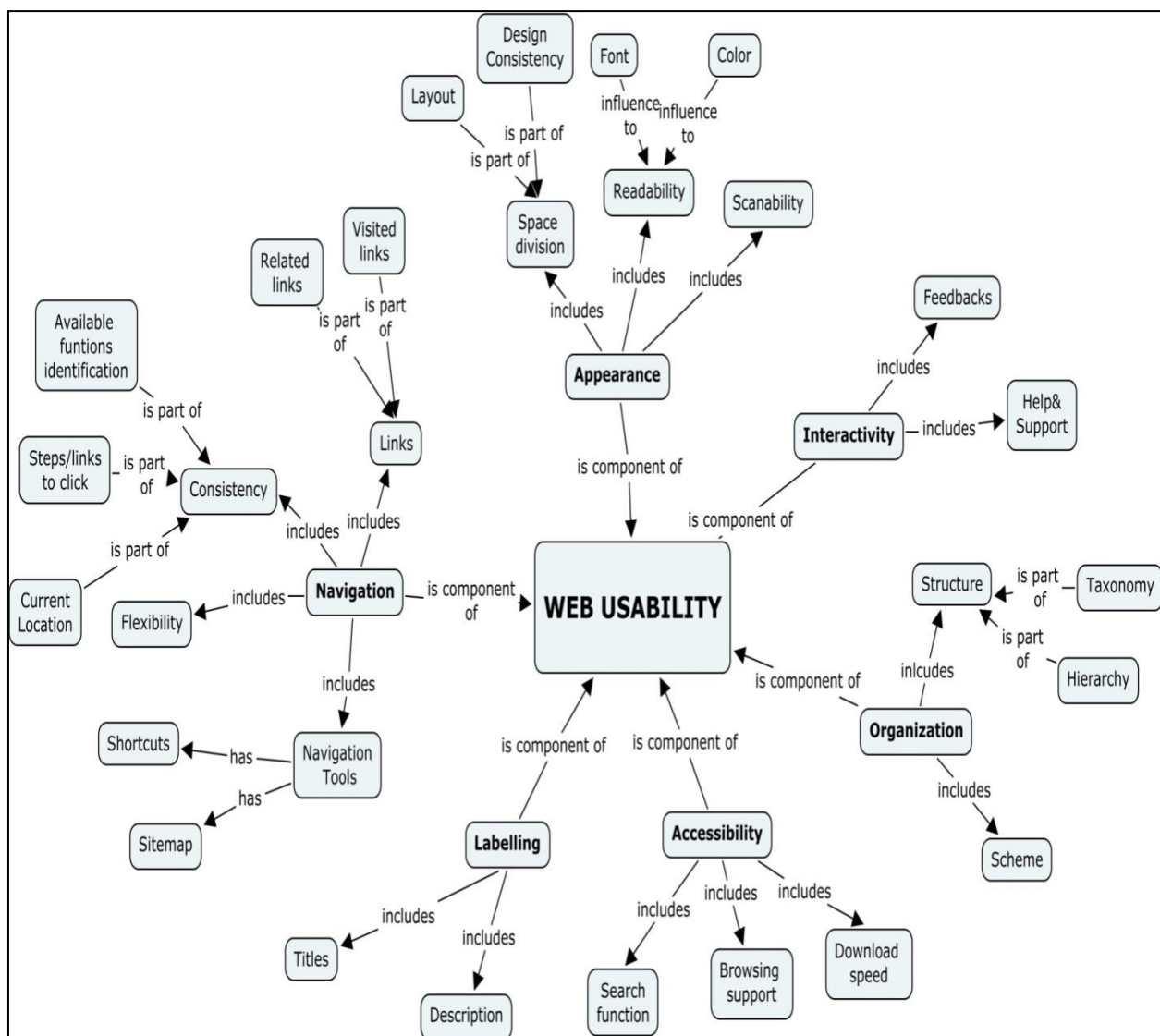


Figure 1: Usability factors that will be used in evaluating the Bazar portal

As can be seen from Figure 1, there are six main categories of factors that will be used to evaluate the web portal usability, which are appearance, organization, navigation, labeling, accessibility and interactivity. Web portal usability is almost identical to general website usability, from that point; all of the listed factors above are also used to evaluate the usability of Bazar portal.

From the literature, these listed factors above are no doubt the most significant factor to the web usability. There is no exception in web portal and it even plays more important roles. These roles derive from different reasons.

In web portal, information is not only humongous in quantity, but also varies in content, which strongly requires a logical way of organization. Web portal provides not only the internal information itself, but the resources from many others websites or portals that provide relevant information. As a result, a well-organized portal and supported is indeed needed to be there to make it much easier for user in retrieving information.

Bazar portal is one of the cases, in which organization should be considered as one of the factors having a strong influence in portal usability. In this sense, the organization system will be evaluated from different aspects: organization scheme and organization structure.

The other evaluation criteria to website usability are all applied to web portal: appearance, navigation, labeling, accessibility and interactivity.

However, the customization factor, which is not available in the portal, will be excluded from the evaluation process.

2.5 Conclusion

This literature review has identified the main criteria for web usability. As there were many different views on which factors should be used in evaluating website usability, and there was no common standard, this literature only identified the one who has strong impacts on website usability and can be evaluated by users.

These criteria will later apply for the specific case, which is the Bazar portal. By seeking the opinion and evaluation of two groups: students and job seekers from practical experience, the current study will seek to evaluate the usability of the portal factors from user's problems and their evaluation on those factors of the portal. More specifically, users' problems will be recognized and analyzed to find out the reasons. From these points, the usability problems will be identified.

CHAPTER 3: RESEARCH METHODOLOGY

This chapter discusses the methodology used in this research, and justifications for it are also presented. Sources of data and sampling techniques used to select questionnaire respondents are addressed. The data collection instruments, including decisions made regarding the design of the questionnaire is examined. Details of the pilot study are given and implications of the results are presented. Since remote usability testing and online survey are used as the data collection tools, a discussion on how these tools are selected and advantages and disadvantages of collecting data these ways are explored. Finally, data analysis methods are discussed.

3.1 Methodology

The Survey method is used to investigate usability problems people experienced in using Bazar for retrieving information.

According to Pickard (2007), the aim of Survey study research is to study the particular within context and has a very specific purpose (p.85), as this study aims to investigate the usability problems that user experiences when using Bazar portal to find out the solution for improving the portal usability, thus Survey study research is chosen for this study. The author also stated that it could be both qualitative and quantitative, but usually quantitative with a limited qualitative element, which is more likely to be anecdotal than truly qualitative (Pickard, 2007, p.95). Since this study uses a combination of modified experimental with log data for user interaction and open and closed questions in the online questionnaire, both qualitative and quantitative data is collected.

In particular, descriptive survey will be used. As mentioned by Pickard (2007), the purpose of a descriptive survey is to describe a situation and/or look for trends and patterns within the sample group that can be generalized to the defined population of the study (p.97).

Since the research employs data that is both quantitative and qualitative in nature, the study may be placed within the post-positivist research paradigm. This stance is strongly supported by

Pickard when she states that post-positivists accept that all discovery is subject to interpretation (p. 10). Moreover, she also pointed out that 'methodological dualism in the use of qualitative and quantitative is accepted practice in post-positivist research' (p. 11)

Furthermore, modified experimental with hypothesis testing is used, however, data only allows a tentative observation of whether or not hypothesis are supported.

3.2 Sampling Strategy and Techniques

3.2.1 Sampling strategy

a. Student and job seeker

As a multilingual portal, the main purpose of Bazar is serving all people that look for information about Norway from different groups such as students, job seekers, asylum seekers, librarians, or other professional users...etc. Students and job seekers group are chosen to be research sample as these are two main groups of Bazar, reported by library.

b. Less experienced and more experienced users

According to Ellis and Kurnianwan (2000), different kinds of users have different notions of usability. Therefore, the sample is expanded further based on users' experience in using Internet for searching information. The aim of this chosen sample is investigating the different perspectives and point of views between different levels of searching experience.

3.2.2 Sampling Techniques

The sampling technique used in this study is snowball sampling. Snowball sampling is used when people who meet the criteria (called candidates) for study are identified. Firstly, a certain number of candidates are chosen. Secondly, these candidates are asked to recommend others candidates. This process continues until enough number of candidates is reached. In this study, the invitation letter are sent out to 20 people to seek for the appropriate candidates who are Vietnamese students coming to Norway for studying and those who are working and may interested in finding job in a foreign country (this case is Norway). These 20 people are expected to forward the invitation to others who have the same purposes.

3.3 Method of Data Collection

3.3.1 The remote usability testing

According to Norlin and Winter (2002), Website Usability testing is defined as a research and development method that involves end users who provide feedbacks on the Website design. The end users interact with the website by completing a set of real tasks. Empirical data such as the end users' behaviors and expectations are then recorded, analyzed and ultimately used to make changes or improvements to the Website. Integration of this iterative design process with the website development process will ensure that the site is easy to use, useful and increases user satisfaction (p. 2).

As with traditional lab-based testing, it would be expensive both in terms of facilities and staffs required for testing. Therefore, recently, there is a new form named remote usability testing, used for testing websites and applications in particular. With this method, the data collection during the test is done automatically and stored for future analysis. The key advantage this technique offers is that many more test users can participate, with little or no incremental cost per participant. Moreover, it has been demonstrated that there are no significant differences between results collected from lab tests and those from remote tests for the same websites (Tullis, Fleischman, McNulty, Cianchette, Bergel, 2002).

As researchers are separated in space and/or time from participants, remote usability testing is used. With this kind of testing, the testing process cannot be observed directly but through the log of participants' sessions. As a result, additional effort is spent to read these logs.

The following table presents advantages and disadvantages for using usability testing.

Table 2: Advantages and disadvantages of usability testing

Advantages	<p><i>Real experience</i></p> <p>User has chance to interact with system as much as possible, and from practical experiences, they can draw out their problems in using the system.</p> <p><i>Incorporate real users</i></p> <p>Users involved in the testing are representative of the targeted audience. Therefore, specific needs of users can be identified. (Norlin and Winters, 2002)</p> <p><i>Employ real tasks</i></p> <p>Website testing involves tasks that are representative of how the website is or should be used.</p>
Disadvantages	<p><i>Cost</i></p> <p>Laboratory and usability engineering resources are needed to conduct the evaluations and analyze the results.</p> <p><i>Realism of the evaluation</i></p> <p>There are some questions should be concerned such as: Have the correct tasks been selected? How will the product work in real work environments? To limit the risk of this disadvantage, the review on other portal, library report was carried out to design the task as real as possible.</p> <p><i>Reliability and validity</i></p> <p>According to Norlin and Winters (2002) two major limitations are related to factors of reliability and validity.</p>

Thus, the remote usability testing method is adopted in this study to conduct empirical research on what users really think about the portal to determine how it can be improved in its new version (Norlin and Winter, 2002, Krug, 2006).

3.3.2 Online questionnaire

Another data collection method that was used is online questionnaire. With the same reason that participants and researcher are apart, questionnaire is considered as the most effective

technique to collect data from respondents. It is believed that a greater number of respondents could be reached via an online questionnaire. As the study intended to identify usability problems then draw out recommendations from respondents' experience and expectation, a questionnaire is deemed to be the most beneficial method to achieve this aim, as a broader perspective could be gained. Table 3 presents advantages and disadvantages for using online questionnaire.

Table 3: Advantages and disadvantages of online questionnaire

<p>Advantages</p>	<p><i>Reach as many respondents as required</i></p> <p>As cited by Wright (2005), Garton, Haythornthwaite, & Wellman, Internet provides more access ability to groups and individuals who are difficult to reach. Furthermore, in this study, the respondents are all online users; therefore, these individuals can be most effectively reached on the Internet.</p> <p><i>Saving time</i></p> <p>Saving time is one of advantages of online questionnaire (Wright, 2005, Andrew, Nonneke, and Preece, 2003, Llieva, Baron and Healey, 2002). Wright also cited that one of the reasons for saving time is that researchers can do another part while waiting for the responses.</p> <p><i>Saving cost</i></p> <p>Online survey also save money by moving to an electronic medium from a paper format (Wright, 2005)</p>
<p>Disadvantages</p>	<p><i>Sampling issues</i></p> <p>There is no guarantee that participant provided accurate demographic or characteristics information (Wright, 2005). Furthermore, their identity or their true feelings about the content of the survey might be affected by different reasons, i.e., they don't want to be too strict when evaluating.</p> <p><i>Access issues</i></p> <p>Technical problems such as messages going to spam folders or respondents cannot redo the survey. To minimize these problems, respondent tracking</p>

	<p>was used to remind every respondent or resend it.</p> <p><i>Response rate</i></p> <p>Low response rate is one of the disadvantages of online questionnaire survey, as pointed out by Couper (2000). As it is not face to face, people easily ignore the survey or it will take time to get their reply. In this study, this disadvantage was limited as the invitation was sent out before looking for respondents who are interested in it, along with the reminder to these respondents about the deadline.</p>
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The usability testing is then divided into 2 sections:

- Section A - Doing the given tasks: In this section, participant will be given a list of tasks that they are going to complete via using Bazar portal.
- Section B - Answer the online questionnaire.

During the progress of searching information, all participant sessions are captured which enabled the sessions to be reviewed after the tasks are completed so that participants could elaborate on their decisions. The log will be used for recording user actions, including pages displayed and the time taken between each page, which is used to collect details about user pathways taken while responding to the questions.

3.4 Data Collection Instrument

This section discusses matters relating to the data collection instrument, including aspects of the design, and pilot studies.

3.4.1 Tasks Design

As there were two groups that would be receiving the questionnaire (Students and Jobseekers), two sets of tasks are created to suit the two groups (refer Appendix 3 and 4). The number and complexity of tasks requested of each group remains the same, but required information is changed slightly based on real practical needs from each group. For example, students are asked to find information about scholarship, education system, master program, etc. In the

meanwhile, job seekers are asked to find related information to their purpose such as: work permit, working environment, etc. The purpose is to make the test as realistic and reasonable as possible, so that the participants can feel most comfortable for what they are searching. As stated by Uddin and Janecek (2007) the tasks should be designed keeping the interest of participant in searching suitable content, otherwise lack of interest may significantly affect the test result (p. 25). After finishing the task, participants are asked to answer questions.

To ensure that the questions were representative of typical uses of this website, several actions were taken to identify these needs:

- Reviewing the report of library to find out what kind of information is useful of these 2 groups (Løver and Agegn, 2008)
- Identifying the general needs of students and job seekers to get the common information
- Reviewing on other portals (Norway portal: www.norway.no, Sweden portal www.sweden.se, Denmark portal www.finno.dk) as they are very alike in aims and purposes. These portals are all information portal, providing necessary information for people coming to their country for different purposes.

With the above considerations, the task list is designed to employ various in locations of the answers within the portal as well as various levels of difficulty. Tasks are then assigned to all participants.

3.4.2 Questionnaire Design

This questionnaire (Appendix 4) is designed to gather information about user's evaluation on the usability of the portal when using Bazar. The ease of use and the problems which they have experienced during their information seeking process are also explored. As there are two dimensions from respondents (less experience vs. more experience, students vs. job seekers) being considered in this study, some additional information is also requested included number of years experience in using Internet for searching information.

The questionnaire was designed to have four sections:

Section 1- General evaluation

Get overview evaluation on the ease of use and other general appearance aspects of the portal such as: layout, font, color...etc.

Section 2 - Organization System evaluation

Including the questions about the portal organization on different aspects: how well the subjects are organized, how logical of the hierarchy and menu order, with the aim of finding out their problems in organization.

Section 3 - Navigation System Evaluation

The questions in this section are designed to get respondents' evaluation on different factors of navigation such as: how easy for them to locate the navigation tools or their present location in the portal.

Section 4 - Searching and supporting system evaluation

This section includes the question to evaluate the searching tools, i.e. Searching, Index. The supporting function such as Help and support is also evaluated.

3.4.3 Pilot Studies

The questionnaire was piloted with one job seeker and two students. Some suggestions for formatting of the questionnaire were given. The suggestions for re-phrasing the professional terms used were followed, minimizing any possible confusion that might arise, either for respondents answering the questionnaire or at the data analysis stage. For example, 'label' is used to present the definition of the title of the page, or name of the category, which then is recommended to change it into other words easily to understand.

Secondly, the pilot participants drew attention into the layout of the questionnaire, the style of the answer-options. In the first version of the questionnaire, options did not follow the same style: some were open ended question, some closed, and some are scale questions, which was

criticized as messy and inconvenient to follow. This problem then was fixed by choosing a consistent style: scale and open-ended questions.

As a result of further feedback received from the pilot studies, it was decided that the scale questions had problem itself when it covered 8 scales, which 1 presented for 'Strongly disagree' and 8 for 'Strongly agree', according to all 3 pilot users, these scales made them confused when choosing, as there is not much difference between 3 and 4. The number also made confusion for evaluating, and then was suggested to be in words. To fix this problem, the 8 number scale was replace by 6 scale, from strongly disagree to disagree, somewhat disagree, somewhat agree, agree and strongly agree.

3.5 Data Analysis Methods

As the data obtained from the questionnaire is quantitative and the data taken from the log is qualitative, different methods for analysis have been used. The descriptive analysis method has been applied to the quantitative data (as mentioned by Powell, 1996) as the following:

- Numerical counts or frequencies
- Percentages
- Measures of central tendency.

Furthermore, as there are two separated surveys for two groups, with the different tasks but the same questions on evaluation, data is combined by Microsoft Excel. This combination is later used to present data for all respondents. The data analysis techniques used for these data were:

- Recoded data into categories where appropriate (William, 2003, p. 251). In this study, the data were categorized in to two groups: students vs. job seekers, less experience and more experience.
- Uni-variate analysis: A single variable is analyzed. Each usability factor which has been evaluated was examined independently (Babbie, 2007)

- Bi-variate analysis: a cross tabulation analysis is used to compare possible differences between two variables: less experience and more experience groups. (William, 2003)

The qualitative data analysis will be a form of deductive content analysis, which was going to analyze the responses from open ended questions and the log data to develop categories for further analysis. These qualitative data are used to support and contextualization of the quantitative data.

3.6 Conclusion

This chapter has provided a detailed discussion of the methodology used in this research. Sampling techniques are used to select participants for usability testing and questionnaire respondents are stated. Details of the pilot studies are presented. Advantages and disadvantages of the remote usability testing and online survey as a data collection tool are considered. Finally, data analyzing methods are discussed. Throughout the chapter, justifications for the choices are provided.

CHAPTER 4: DATA ANALYSIS AND DISCUSSION

The following data analysis is divided into 3 sections. Section 4.1 reports the results from respondents including students and job seekers. Next, correlation analysis comparing the results of the less-experience group with those of the more-experience group is presented in section 4.2. Section 4.3 discusses about the findings. Respondents' quotes are cited as they appeared in the questionnaire, with the exception of typographical errors have been corrected.

The total number of responses received from students is 20, with 16 (80 %) complete surveys, i.e., all questions have been answered. A total of 17 responses were received from job seekers, with 15 (88 %) complete surveys. The total response rate is 84 %.

The resulting percentages for a question are calculated based on the number of answers for that question rather than the total number of responses. In other words, for a question, incomplete answers have been subtracted from the total number of responses. The Questback program presents results in the two-decimal format.

The data analysis process was divided into two separate parts for students and job seekers because they are main users of the portal. However, after reviewing and analyzing the responses, findings show that there are no significant differences in evaluation and usability problems they experienced. Therefore, the combination is made. The analysis is presented from 37 respondents (20 from students and 17 from job seekers). Differences between the two groups will be mentioned particularly when exist.

4.1 Data Analysis

4.1.1 Searching experience

Table 4: Respondents' experience in using Internet for searching information

Year(s) of experiences	Student	Job seeker	Total
< 1	1	1	2
1-3	3	1	3
3-5	3	0	3
>5	13	15	28

Respondents' experience in using Internet for seeking information is varying. However, the number of respondents of the first three groups is very few. Therefore, the experience is evaluated in two main groups, which are named as less-experienced group, for respondents whose experience is less than 5 years. The other group, called more-experienced group, is for those who have more than five years experience working with the Internet to find information.

4.1.2 Appearance



Figure 2: Respondents evaluation on portal appearance – 3a: evaluation on appearance criteria, 3b: evaluation on overall design interface

Generally, the portal appearance is evaluated quite poor. Even the average rate of the appearance factors is 2.08, it can be seen from Figure 2 that respondents' evaluation on the interface design of the portal is not good, justified by 75% disagreement. Image is judged as the

worst factor with the average rate is only 1.89, while font is the best factor of the appearance. In particular, some small issues pointed out by the respondents are as follows.

a. Font and color

Table 5: Respondents' evaluation on font and color (%)

	Font	Color
Very poor	11	13
Poor	54	49
Good	35	38
Very good	0	0

Table 5 shows that the font and color are evaluated somewhat poor. In fact, the font does not adapt to different screen sizes. Consequently, when respondents browse the portal with small display devices, it is difficult to follow the menu because words of the title of some menu items are not presented in the same line make it confusing whether they belong to the same or different items. This also extends the layout to a very long page. Therefore, respondents have to do a long scroll down to see the complete menu. In addition, they are set inappropriately for different components of web pages, e.g., menu and description. Some of respondents also have problems with font and color, which make them confused in distinguishing between titles and subtitles, titles and contents. Table 6 lists some of comments from respondents on font and color.

Table 6: Comments from respondents about font and color

Respondent #	Comment
11	'The font and color [are] now quite messy with many types of size, which is not appropriate, while font size [of] the description for the page is even bigger than the menu font size'
8	'The menu should have bullets or numbering or could be recognized by different font size[s], font type[s] or color[s] from different level[s] of category'.
2	'Imbalance between sidebar size and main contents size should be improved.'

b. Layout

Table 7: Evaluation on portal layout and menu (%)

	Layout	Menu	Image
Very poor	31	22	27
Poor	44	51	57
Good	25	27	16
Very good	0	0	0

The next issue comes from the overall layout of the portal. Table 7 shows the percentages of respondents assessing the layout in scales from very poor to very good. It can be seen from Table 7 that 75% of the total number of respondents evaluates the layout from very poor to poor, and none of respondents judges it high along the scale. One of reasons is that the menu is located on the right side of the window, not on the left side as usual. There are two respondents considering this as their problems, which make it not easy to follow

Table 8: Comments from respondents about portal layout

Respondent #	Comments
16	'The position of the information list [menu] should not be located at the right side because the readers could feel a bit hard to find any topic that they want'
37	'The menu is in the right side bothers me somehow'

c. Menu

The appearance of the menu also causes problems for the respondents. From Table 7, there are 73% of them evaluating it as very poor and poor, while no one is really satisfied with it. According to some respondents, the menu is very long with many sub-subjects; furthermore, it is difficult for them to distinguish between titles and sub-titles, i.e., no border or space between menu items.

d. Images

The percentage of respondent judging portal images also can be seen from Table 7. 84% of respondents feel the image of the portal is 'very poor' and 'poor'. In fact, the portal looks very simple with no images. According to one respondent, this influences the overall of portal appearance, making it boring and not lively.

4.1.3 Organization

Figure 4 shows the evaluation on the organization in terms of subject organization, information hierarchy (logical level of information), and menu order.

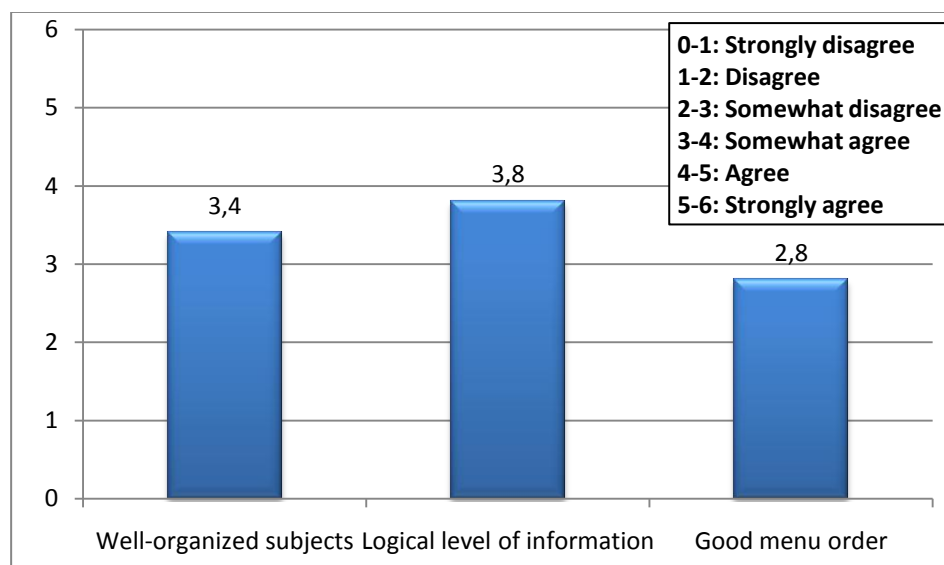


Figure 3: Respondents' evaluation on portal organization

It can be seen from Figure 3 that the respondents only 'somewhat agree' with the organization of the portal as the average rate of the three factors is 3.36, in which the most significant problems of the organization is the menu order, which is the order of menu items (subjects) in the menu.

a. Subject organization

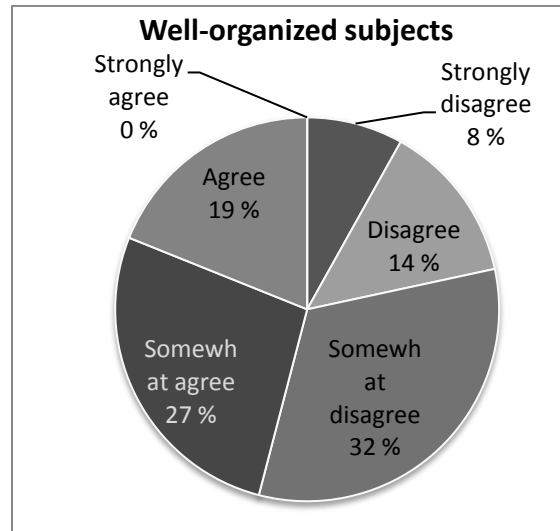


Figure 4: Respondents evaluation of subject organization of the portal

When evaluating on how well subjects are organized in Bazar, there are 54 % of respondents that state the subjects are not well-organized (in the range from strongly disagree to somewhat disagree), and none of respondents strongly agrees with the organization. In more detail, there are seven main subjects followed by sub-subjects in the portal. They are:

- Bibliotek
- Culture
- Information about Norwegian society
- Learning Norwegian
- LesNorsk
- News
- Organizations for ethnic minority languages

However, most of the respondents have the same opinion that the division between main subjects and sub-subjects are not logical. For example, 'Learning Norwegian' and 'LesNorsk' are very related but considered as two different subjects. In addition, 'LesNorsk' is again appeared as a sub-subject under 'Learning Norwegian'. It could be seen from the log that most of respondent tried to click to both of them for discovering. Another example is that 'Information

about Norwegian society' includes 20 sub-subjects, which could be divided into some main subjects and followed by sub-subjects.

Table 9: Comments from respondents about portal organization

Respondent #	Comments
24	'The subjects somehow overlap each other and the users may sometimes get confused with [too] many provided subjects. Related contents should be [grouped] in a greater subject.'
27	'The organization of the content of this bazaar is not good. It is simply confusing for people who are trying to look for more information from this source. The index [menu] of each item in the menu on the right side should be separated and grouped accordingly. If possible, provide [pre-selection] topics for each group of people. For example, for people who are going to work in Norway, filter the content of VISAs, accommodations, transportation, tax, etc which is very relevant to them. Similarly for students and other professionalism.'
30	'To have more subcategories of information instead of many subjects under one main topic.'

Furthermore, it is recommended by some respondents that subjects should be understandable and familiar: '... sorting the information into broader topic with familiar terminologies like 'Education', 'Transportation', and '[Accommodation]' would help the users more.' (Respondent #3)

b. Information hierarchy

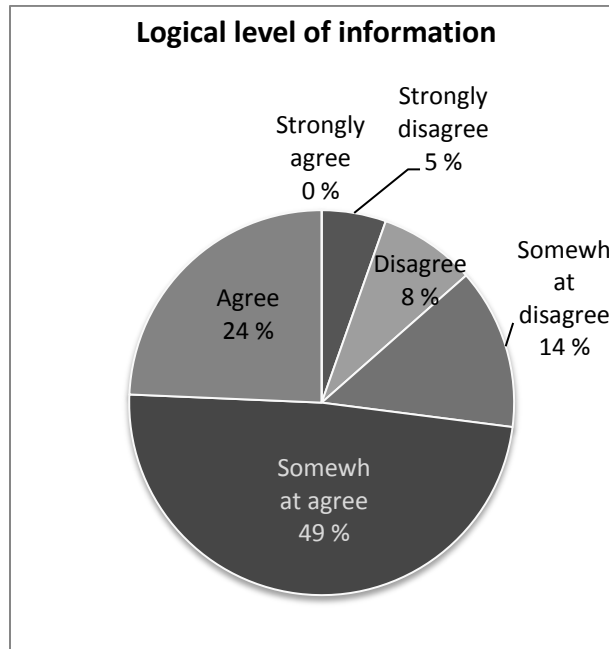


Figure 5: Respondents evaluation on information hierarchy of the portal

Most of the respondents agree that the hierarchy of information is very logical, but some still have difficulties in using categories for searching. It can be inferred from the log (Appendix 5) data that when searching information for education system in Norway, some respondents spent a lot of time browsing around the menu and could not find the relevant information. As a result, the portion of respondents who have successfully completed this task is only 60%. According to these respondents, the education system should be one of the main categories, equal to work, health or the others rather than being mentioned in the content of the broadest category 'Information about Norwegian society'. The same problems occurred with other important categories, such as Work, and Family.

c. Menu order

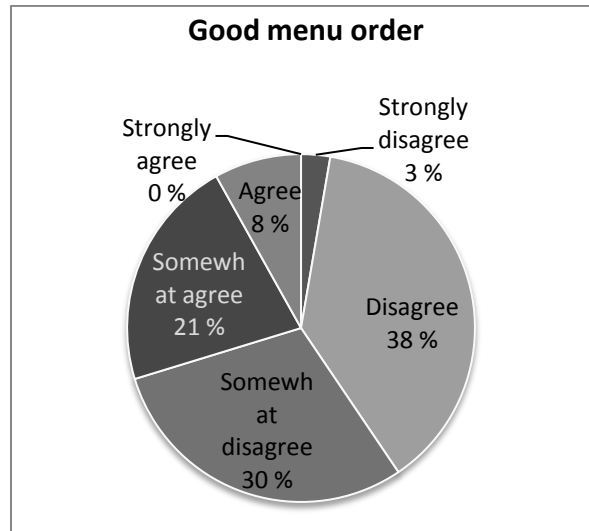


Figure 6: Respondents evaluation on menu order of the portal

Figure 6 shows that 80 % of respondents disagree that the current menu order is good. Some of respondents even do not recognize that the current order is alphabetical (they suggest this order for improvement). The reason might derive from the unfamiliar subjects, and some titles are too specific, e.g., sex information, and the elderly, etc. This makes them look like there is no order at all.

It can be observed from data that respondents experienced not many problems from the information structure of the portal. However, a long menu with too many subjects which are not well organized has strongly limited respondents' ability to find out information.

4.1.4 Accessibility

Table 10: Respondents evaluation on the ease of browsing and finding information in the portal (%)

Ease of browse	Student	Job seeker
Strongly disagree	5	18
Disagree	11	23
Somewhat disagree	47	29
Somewhat agree	11	24
Agree	26	6
Strongly agree	0	0

Overall, it seems not easy for both groups to browse and find information in the portal (63% disagreement from students and 70% from job seekers). However, it can be observed from Table 10 that the job seeker group has more difficulties of browsing than the student group, when 41% of respondents of this group evaluate the ease of the portal as ‘strongly disagree’ and ‘disagree’. The problems they experienced will be discussed as follow.

a. Search

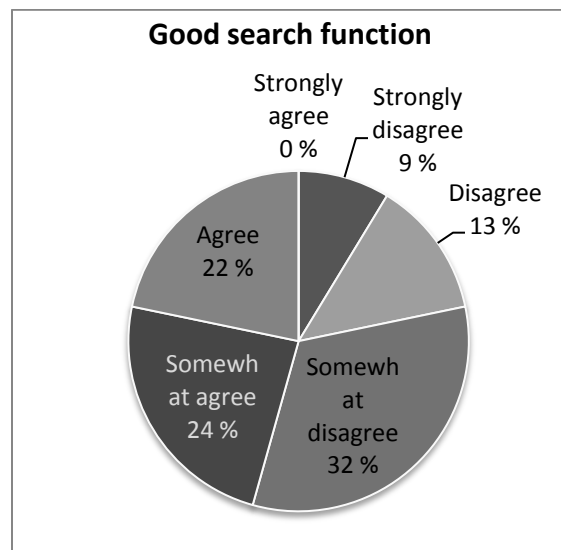


Figure 7: Respondents evaluation on search function of the portal

After analyzing the log of information searching process, searching seems to be the problem that most of the respondents have experienced. However, it is surprising when the rate of agreement and disagreement for evaluating this function is almost equal (46% vs. 54%). By analyzing the steps that respondents undertook during their searching process, 2 main issues are identified:

Keywords

Choosing keywords is the significant issue in searching process. From the log data, many related keywords are used but no results are returned. For example, when searching for information about education: different keywords are used such as: ‘university’, ‘education’, ‘textbook’, and

they all led to ‘Nothing found’ result. The problem is revealed by the comments of respondents shown in Table 11.

Table 11 Comments from respondents about keyword searching problem

Respondent #	Comments
3	‘When using search tool with common terms, it's hard to find the information. Often, the result is ‘nothing found’’
6	‘Sometimes really easy query but system still returns no result.’
15	‘Should tag more keywords to results. The simple keyword ‘Education’ shows no result’
23	‘The search also only look for the exactly words but people often use different words for same purposes.’
32	‘Many common key words cannot be found’
34	‘Whenever I do searching, if I enter 'correct' keywords, I get 'correct' pages. If not (enter the same meaning but slightly different keywords), ...The search systems need to be improved to return relevant information, even if user enter keywords that do not match 100% with what are stored in the system...’
37	‘The search will be very useful if it work properly. Seams that it work[s] just matching the search with the items in menu. Maybe it can be improved using keyword or a semantic analysis.’

The above issue comes from the fact that Bazar only supports searching the titles, not the content, of documents. Therefore, only keywords that appear in the title return expected results. For example, when respondents find related information about hospital, the keywords ‘hospital’ or ‘clinic’ return no result. For this case, one valid keyword is ‘health’ because it is in the titles of health care documents, whose content include ‘hospital’.

Another problem that respondents consider as an issue when searching is that the portal does not provide the related keywords for their query. According to these respondents, there should

be a related keyword list to support respondent's searching process, especially when respondents do not know whether their chosen keywords are right or not.

Table 12: Comments from respondents about keyword searching problems

Respondent #	Comments
21	Should have suggestion keywords list to assist user searching easily
23	The search function was not good enough because it does not suggestion common keywords which are very important with foreign people
31	Related keywords may appear at the same time users search for their keywords. For example: search for 'employment', but 'salary', 'work insurance' ... should be accompanied.

To sum up, searching by keywords only works effectively when exact keywords are used; otherwise, it seems useless. That could be a reasonable explanation for the fact that over a half of respondents (56%) say that it is difficult for them to use the search function to get the right information.

Results

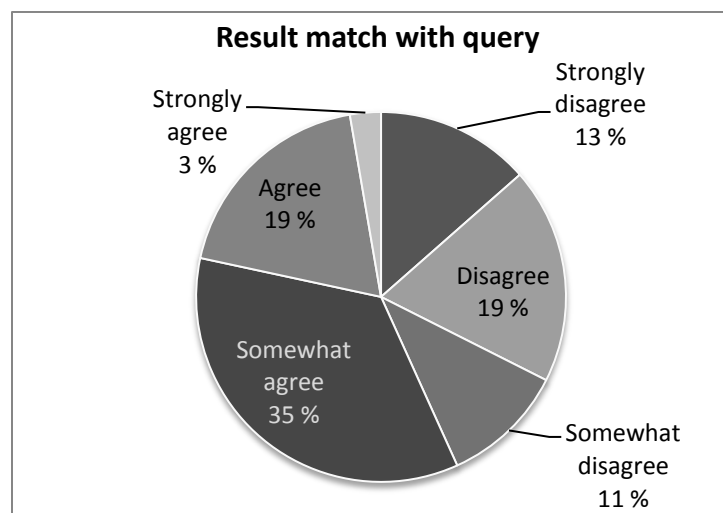


Figure 8: Respondents' evaluation on result problem when searching

Figure 8 show that 43% of respondents obtain irrelevant results. According to Bohmann (2000), search result page serves two simple goals for the respondent: to provide exactly the information respondents look for, while ignoring less relevant information; and to present the information in a language and format that is easy to understand and use. Taking this as a criterion for an effective searching function, the search function of the portal needs to be improved. In particular, results are not ranked by any order. For instance, when respondent #14 tried to search for '*Nha khoa*' (in Vietnamese), which means 'Dental', the result was not only '*Nha khoa*' but also '*Tay Ban Nha*', which means Spain, and '*Tay Ban Nha*' is positioned before '*Nha Khoa*' in the hit list.

The respondents #10, #11, #24, 26# have the same opinion when stating that the result should be arranged in order of relevance.

Table 13: Comments from respondents about searching results problem

Respondent #	Comments
10	The results should be displayed in the rank order= it means the most relevant results will appeared on the top of list
11	The result need to range by relevant items
24	When user search[e]s with his own language, the result with the corresponding language should always be listed above other same results of other languages
26	Provide the list of search result by the keyword match priority please

b. Index

The portal index has rarely been used during the search process. Only 10 out of 37 respondents (27 %) used this searching tool. It is quite difficult to explain the reason why the portal index is not used, it might be because respondents prefer searching rather than looking into the index, or it could simply because they do not consider it as a searching tool.

For those who searched the index, it is observed from the log data that the main difficulty comes from the index terms. The index of Bazar is simply a 'flat' version of the menu, i.e., it includes all the subjects and sub-subjects of the menu without hierarchy sorted by alphabetical order. Therefore, firstly, the index terms have the same problems mentioned in 4.1.3.3, e.g., using uncommon words.

Table 14: Comments from respondents about portal index

Respondent #	Comments
3	The portal index often use quite not so common languages, can make the users confuse and also hard to search ---> should use more common language, not so academic
23	The portal index does not help me at all. One of the [reasons] is that the index [looks] really messy with different languages.'

Secondly, it does not contain popular keywords for common topics, which are very useful in searching. For example, there are no index terms for education, e.g., 'study', 'university' in the index.

Overall, the portal provides some support tool for respondent searching process in both search function and portal index. However the provided search function is quite simple and the index is not built effectively either. Respondents' expectation is that the search function should be advanced, e.g., Boolean operators on keywords, or wild-cast search; and the portal index should provide more meaningful terms.

4.1.5 Navigability

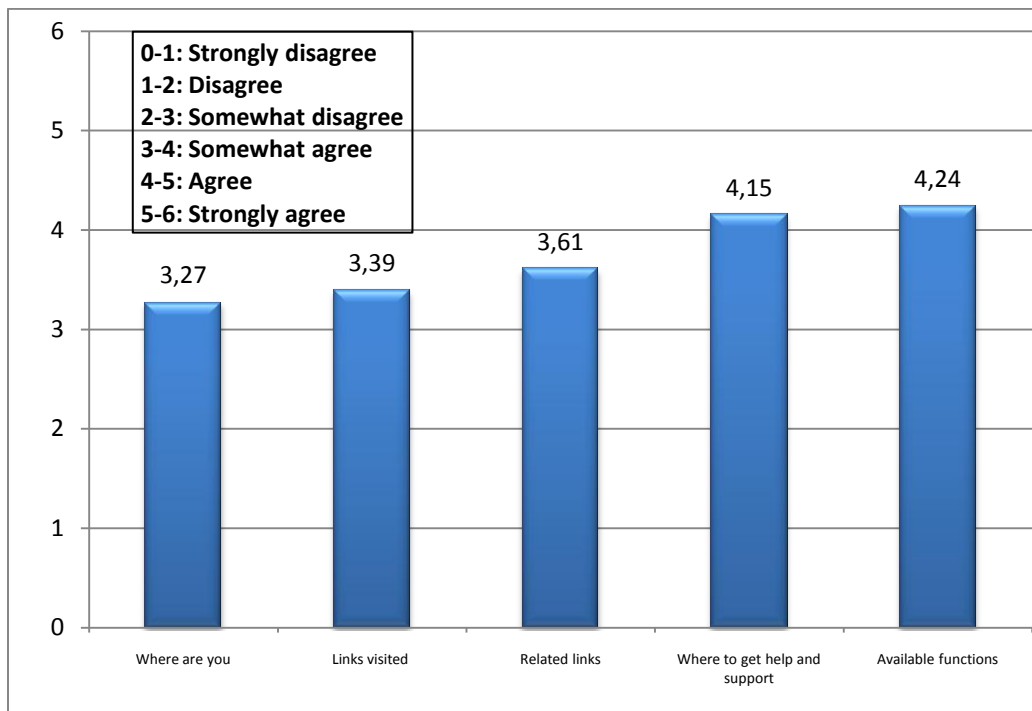


Figure 9: Respondents evaluation on how easy for them to find out the navigation

a. Location Identification

The portal does not show the present location for respondents. Based on the log data, nearly a half of respondents (49%) finds that it is not easy for them to locate where they are in the portal, i.e., there is nothing to recognize their position in the portal, making them easily get lost. They choose to start from the beginning by going back to the homepage. Another half of respondents (51%) might use the 'Back' button or check the menu to identify the current location.

b. Related content

The related content is listed out under each sub-page of every subject in the menu. The list of the internal or external resources is easy to be recognized and used. 68 % of respondents agree that it is easy for them to locate the related content under every subject. Although the rate of disagreement is 32%, the reasons they point out are not relevant to the navigability. Therefore, they are not mentioned here.

c. Visited link identification

There are 56% of the respondents disagreed that it was easy for them to identify visited links. In fact, the visited links are only marked by different colors in the index page. Therefore, if respondents do not go to the index page, they are not able to recognize the links they have clicked on. However, it is not clear whether or not they find it easy because they do not mention any specific reasons or comments.

d. Shortcut

The provided shortcuts seem quite easy for respondents to recognize as it achieves nearly 70 % of agreement. Most of the shortcuts including 'home', 'index', 'help', 'about', and 'contact' are located on the bar that is shown permanently at the top of every page. The language-choice function is a small dropped-down box located in the right corner under the menu of every page. Wherever respondents are, they can easily choose their preferred language. Still, over 30% of the respondents have failed in reaching this function because the title of the language box is in Norwegian, even when they have already chosen their preferred language.

4.1.6 Labeling

Table 15: Evaluation on title understanding (%)

Understandable titles	Student	Job seeker
Strongly disagree	0	6
Disagree	0	6
Somewhat disagree	21	24
Somewhat agree	37	35
Agree	42	29
Strongly agree	0	0

a. Title

It can be seen from Table 15 that there are no significant problems from the titles of categories as well as the titles of internal and external sources with agreements from nearly 71% of the number of the respondents. A small number of 'somewhat disagree' (29%) respondents who

find that those titles are not understandable because of the translation, which will be identified in the multilingual support section.

b. Description

The description of links also gets a high agreement rate of 68 %, which indicates that it is not a serious problem. However, 32% of the respondents still have difficulties due to multilingual problems. ‘Descriptions of the links on the left side are almost in Norwegian, users do not know where they may lead them to.’ (Respondent #24)

4.1.7 Supportiveness

Multilingual support

Language seems to be most considerable problem when mentioning about the labeling system of the portal. Even being evaluated as a good translation (68 %) and effective multilingual supports – with 14 different languages supported (59%), it is still considered by many respondents as their problem when using the portal.

Firstly, the mixture of language appears on every page, even when respondents already selected a language from the beginning, e.g., ‘Bibliotek’ appears in the main menu, ‘International news’ appears under the ‘Tin Túc’ (in Vietnamese) menu item, or ‘Diverse hus og hjem’ appears in the Vietnamese index. Another example is that even when the chosen language is English, the description for internal or external links is not all in English, but also in Norwegian. This mixture seems to cause confusion for respondents; it could be justified by their responses as follow:

Table 16: Comments from respondents about language problem

Respondent #	Comments
26	‘In the viewpoint of using multi-languages function, I’ve found out that when I click to some topic that have the England flag (which could be considered as English topic), the content inside is only Norwegian language.’

3	'Information does not show mainly in English even users have chosen.'
24	'Descriptions of the links on the left side are almost in Norwegian, users do not know where they may lead them to.'

Another problem is that respondents have to repeatedly choose their preferred language during their session because the portal does not remember which language has been chosen before. Respondent #3, #6, #10, #17, #19, #20, #23, #26, #34 all experienced difficulties with the translation system of the portal. After choosing a preferred language, when they moved to another page, e.g., the index page, the display language was automatically changed to Norwegian. Consequently, they had to choose their preferred languages many times. According to these respondents, this problem is the most significant that should be improved for the portal. Table 17 shows respondents' comment about this issue.

Table 17: Comments from respondents about language supports problem

Respondent #	Comments
3	'The translation should be homogeneous once the users choose[s] the language from the beginning, not that every section they have to choose again when go to the details. It makes the interface of the website looks a bit messy.'
23	'The multilingual support is not good now. When the users choice one particular language, the system still print out different language as suggestion information. It would make users get confusing...it seems that every time when users click on the menu (Home, Contact, Help..) the system automatics change the current chosen language to Norwegian'
34	'[Language] should be changed accordingly whenever users click to the language they wish to read. For ex: click English but Norwegian still appears'

In conclusion, the data indicates that the portal translation system is not well supported. As a multilingual portal, this factor should be considered as one of the most important factors for future improvement.

4.1.8 Overall evaluation

Table 18: Evaluation from two groups on evaluating the ease of use of the portal (%)

Ease of use	Student	Job seeker
Strongly disagree	5	29
Disagree	15	12
Somewhat disagree	25	29
Somewhat agree	35	12
Agree	20	12
Strongly agree	0	6

Table 18 shows the assessment from two groups in evaluating the ease of use of the portal. As can be seen from Table 18, it seems easier for the student group to use this portal with an agreement rate of 55%. Meanwhile, the job seeker group seems have more usability problems when 70% of them disagreeing that the portal is easy to use, especially 30% of them strongly disagree.

In conclusion, as a consequence of respondents' interaction with the portal in the searching process and their evaluation on different aspects of the portal such as interface design, information structure, navigation, searching tools, etc, the usability problems are identified.

4.2 Correlation analysis of two groups 'Less experience' and 'More experience'

In this section, the 'Less experienced' group will be named as 'Group L' and the other will be named as 'Group M'.

As the tasks for students and those for job seekers are different, it is impossible to get the successful rate based on experience. The comparison between these two groups will focus on their evaluation on different aspects of the portal.

It is expected that with more experience using the Internet for searching information, Group M would find it easier to search and browse within the portal. However, the evaluation interestingly shows that that 56% of respondents of Group L think the portal is easy to use, while only 40% of respondents of Group M have the same idea (Table 19). The difference might indicate that Group M has more problems when using the portal than Group L. This supposition is supported by a detailed comparison of the information searching process of the two groups.

After doing a statistical analysis, it has been discovered that there are no significant differences between two groups in their evaluation on the following criteria: labeling, supportiveness, index...Therefore, this section will concentrate on the factors that result in different assessments.

Table 19: Evaluation on the ease of use of the portal from Group L and Group M (%)

Ease of use	Group L	Group M
Strongly disagree	0	21
Disagree	22	11
Somewhat disagree	22	29
Somewhat agree	45	18
Agree	11	18
Strongly agree	0	6

4.2.1 Appearance

Table 20: Evaluation on well designed interface from Group L and Group M (%)

Appearance	Group L	Group M
Strongly disagree	0	21
Disagree	22	11
Somewhat disagree	22	29
Somewhat agree	45	18
Agree	11	18
Strongly agree	0	6

Table 20 shows respondents' evaluation on how well the interface of the portal is designed. It shows that the less experience group is more satisfied with the portal design than the more experience group. Although both groups agree that that the portal is not well designed, the disagreement from the Group M is nearly 80%, while that percentage of Group L is lower, only 56%.

Respondents from both two groups have the same opinion when evaluating the font, color and image. Their evaluations on these factors almost stay on very poor and poor scale. Group M seems stricter as they use 'very poor' scale more often than Group L. For example, Group M evaluates the layout of the portal with 37% of 'very poor' scale, while that percentage of Group

L is only 11%. It is the same for evaluation on color when no respondents from Group L assess it as 'very poor' while there is 18% of respondents from Group M choose this option.

4.2.2 Organization

Comparisons on the organization of the portal between two groups are made from different aspects: subject organization, information hierarchy and menu order.

a. Subject organization

The similarity between these groups while evaluating the subject organization is that none of them strongly agree that the portal provides a good organization of subjects. The percentage of agreement from Group L is 56%, while that of Group M is only 32%. Especially, the percentage of strongly disagreement can be found in Group M is 11%, while 0% of this scale is found in Group L.

Table 21: Evaluation on subject organization of the portal from Group L and Group M (%)

Subject organization	Group L	Group M
Strongly disagree	0	11
Disagree	22	11
Somewhat disagree	22	36
Somewhat agree	22	28
Agree	34	14
Strongly agree	0	6

b. Information hierarchy

Table 22: Evaluation on information logical information hierarchy of the portal from Group L and Group M (%)

Logical information hierarchy	Group L	Group M
Strongly disagree	0	11
Disagree	22	11
Somewhat disagree	0	36
Somewhat agree	45	28
Agree	33	14
Strongly agree	0	0

Table 22 shows the evaluation of two groups on logical information hierarchy of the portal. It can be seen that Group L is more satisfied with the portal hierarchy than Group M, when nearly 80% of respondents in Group L see it as logical. The rest of these respondents only 'somewhat disagree' with the statement. In contrast, the disagreement from Group M is pretty high, nearly 60%.

Menu order

Table 23: Evaluation on good menu order of the portal from Group L and Group M (%)

Good menu order	Group L	Group M
Strongly disagree	0	3
Disagree	22	43
Somewhat disagree	34	29
Somewhat agree	33	18
Agree	11	7
Strongly agree	0	0

Repeatedly, evaluation on menu order of the portal witnesses the same phenomenon when the percentage of disagreement of Group M is more than that of Group L. Even more than a half of respondents of Group L (56%) opposes that the present menu is in good order, it is still nearly 10% less than that disagreement of Group M.

It has been discovered that the problems which respondents from two groups experienced in organization during information seeking process are all the same, which has been discussed in detail in the previous section.

4.2.3 Accessibility

Searching function

It is somewhat surprising that most of the respondents from Group L judge the searching function as good (nearly 90%), while it is equal between the rates of 'agree' and 'disagree' in Group M evaluation (Table 24).

One of the reasons discovered from the log data is that respondents in Group L used 'correct' keywords for searching; therefore, they can easily get the right information. Respondents from Group M tried to use many keywords but still failed in getting right results. As the search

function of the portal only supports searching for the keywords, which appear in the menu, not the content of the resource, when these respondents do not use the 'right' keywords, they cannot find the information they want. It is also a logical explanation when many respondents of Group M find the search function of the portal does not work effectively and have many complaining about the keywords problem.

Table 24: Evaluation on effective search function of the portal from Group L and Group M (%)

Effective search function	Group L	Group M
Strongly disagree	0	14
Disagree	0	22
Somewhat disagree	11	14
Somewhat agree	45	25
Agree	44	21
Strongly agree	0	4

4.2.4 Navigation System

Table 25 shows the evaluation of respondents on how easy to identify links they visited and related links to the information they are looking for. Overall, it seems that Group L has no significant problems in navigating links in the portal, whereas Group M has more problems with this function. This is supported by 63% disagreement on how easy to find the visited links and more than 40% find it is not easy for them to locate related links.

The reasons might come from their different expectations. Respondents from Group L feel it is easy for them to go back and forward in the portal, as well as find out links they visited and relevant links to information they are looking for. Only 34% respondents of this group find it 'somewhat' difficult for them. The reason has been discovered from the log is that they used the 'Back' button and the Menu to identify their locations.

On the other hand, respondents from Group M might expect more navigation tools in the portal like navigation bar, navigation route, etc... As the portal doesn't provide those kinds of navigation tools, these respondents then find it is difficult for them to navigate.

Table 25: Evaluation on how easy to identify visited and related links in the portal from Group L and Group M (%)

Easy to identify	Visited links		Related links	
	Group L	Group M	Group L	Group M
Strongly disagree	0	14	0	14
Disagree	0	22	0	22
Somewhat disagree	11	14	11	14
Somewhat agree	45	25	45	25
Agree	44	21	44	21
Strongly agree	0	4	0	4

To sum up, it can be concluded from these data that Group L is more satisfied with the portal, while Group M experiences more usability problems. One reasonable explanation for this surprising result is as follows. With more experience, Group M seems familiar with more complicated/advanced techniques to search information. However, as the portal only provides simple functions, their searching is not successful and cannot find the information they want. With more experiences, respondents in Group M have used better portals. Therefore, they become stricter in evaluation.

4.3 Discussion

4.3.1 Findings

This sub-section is going to summarize the factors, which have been discovered as respondents' problems in using Bazar portal. The findings show that respondents all experienced usability problems in design, organization, search, label and language support of Bazar portal during their information seeking process.

First of all, the portal design makes it difficult for respondents to scan through the general information, as they are confused in identifying the subjects and the sub-subjects of the menu. The location of the main menu, on the right side, reduces respondents' satisfaction. According to Hudson (2004), during the early years of the Web, a navigation tool (main menu) was usually shown as a bar across the top of each page. This is a very common practice, especially with small sites. However, recently, the popular place for navigation bar has been changed to left-

hand side. Therefore, whenever browsing the web, respondents tend to expect the navigation to be located in the left side. Furthermore, with no graphics used, the portal looks quite simple, monotonous and boring, as commented by some respondents. Thus, this is an indication in favor of hypothesis H1.

Secondly, the categorization of menu is not clear to respondents. The menu includes 7 categories. However whenever respondents choose their preferred language, the main category – information about Norwegian society will show up. As this menu covers over 20 topics, it appears as a very long list. Consequently, it is quite messy and not easy for respondents to follow. In addition, the content of menu is also an issue for respondents when some of them are single topics with no sub-subjects, while other include many specific sub-subjects, making the menu not balanced between menu items. In fact, the menu hierarchy is narrow and deep, rather than the preferred wide and shallow (as cited by Gullikson et. al., 1999). As a result, it demands many mouse clicks to check if required information is available, and makes respondents confused in searching for their topics. Thus, this is an indication in favor of hypothesis H2.

The search function is the next problem of the portal, as it limits the ability of using portal and getting the required information. The keyword search allows respondents to search only in the titles, not the content of documents. Moreover, the keyword search only works effectively with the exact keywords, which appear in the title, without any suggestion for related keywords. When respondents cannot find relevant information, they assume that no answers are available on the portal, rather than thinking that they used 'wrong' keywords. Thus, it seems useless to use search function for respondents who do not know which correct keywords should be used.

The searching result is also considered as an issue of the portal search function as it fails in presenting the exact information respondents are looking for with ignoring less relevant information and not providing information in an easy-to-understand format. The mixture of documents with different languages and no priority and/or order makes results look confusing and difficult to use.

From the above discussion, this is an indication in favor of hypothesis H3.

In addition to organization and searching problems, Bazar portal has poor navigational capabilities. In general, respondents expect to find navigational tools to identify their location in the portal or the links they have already visited present on all web pages. Respondents are never given cues to where they are in the menu structure, e.g., at the second level, third level, etc, which means that respondents get lost and confused in the menu. In other words, this is an indication in favor of hypothesis H4.

Language seems to be the most significant problem of the portal. As a multilingual portal, there are 14 languages supported in Bazar. However, it does not work effectively. There is a mixture of language between English and Norwegian even when respondents already chose their preferred language. The titles of documents are in English or Norwegian only, the same case occurs with document titles' description. As respondents do not know the content of the documents they led them to, they have to check out every document to see what information is provided. Another problem is that respondents have to choose again and again their preferred language during their session because the portal does not remember which language has been chosen before. This repeated action not only wastes respondents' time but also makes respondents feel annoyed and not comfortable. As a result, these are an indication in favor of hypotheses H5 and H6

The limitation of language problems has strong influence on the portal usability. As languages are not well supported, respondents have been limited themselves in reading, understanding and using information.

This study indicates that language support is a factor that has a significant impact on the portal usability, especially for multilingual portals. As there are many opinions from respondents about their language support problems when using Bazar, along with many recommendations for improvement in language support, it is believed that language support is one of the most important factors to the usability of a multilingual portal.

4.3.2 Discussion for student and job seeker group

It was expected at the beginning that student and job seeker group might experience different usability problems as they have different purposes and different abilities. However, after analyzing the information seeking process and both two groups' evaluation, the data shows that they have almost same problems when doing the tasks. Therefore, this is at odds with hypothesis 7.

4.3.3 Discussion for less experience and more experience group

The most considerable differences of problems between Group L and Group M after using the portal for searching information manifest in the information hierarchy and search function of the portal.

The result shows that Group L is more satisfied with the portal hierarchy than Group M, when nearly 80% of respondents in Group L see it as logical and none of them strongly disagrees. In contrast, the number of respondents in Group M having the same opinion is only about 40%, a half as many as those in Group L, and the disagreement percentage is pretty high, nearly 60%.

The hierarchical problems occur when respondents search for information in the system and are not able to find out the results as the system is set up with an unfamiliar hierarchy. Related to this problem a reasonable explanation could be unfamiliar information hierarchies of the portal. For example, information about retirement should be located under the subject 'Employment'. However, in the portal, this topic only can be found under the subject 'The elderly', which is not entirely familiar to respondents. Another problem is that the hierarchy of Bazar is not balanced. Some subjects cover too many topics while the others cover very few. Some of them could be grouped under the same topic, such as 'Living together', 'Parents and Child', can be put under the same topic 'Family' or 'Relationships' to make the menu shorter. As the menu is too deep and long, respondent easily find it difficult for them in navigating their desired information.

In addition to the organization problems, searching is another problem that can be considered as a substantial difference between Group L and M. As it was expected from the beginning, with more experience in searching and browsing websites in seeking information, Group M might

have more searching skills, thus have more chances to get to the right information, and face fewer challenges than Group L in using search function. However, only a half of respondents of Group M can use search function effectively. Surprisingly, with less experience, almost respondents from Group L judge the searching function as good with very high percentage (nearly 90%).

Keywords are one of the reasons for failing in getting results. As the search function of the portal only supports searching for the keywords, which appear in the menu, not the content of the resource, if respondents do not use the 'right' keywords, they cannot find the information they want. Respondents in Group L used 'correct' keywords for searching; therefore, they can easily get the right information. Respondents from Group M tried to use many keywords but still failed in getting right results. It is also a logical explanation when many respondents of Group M find the search function of the portal does not work effectively and have many recommendations to improve keywords problem.

On the other hand, respondents in Group M get used to advance searching, as well as other searching support functions such as: related keywords are provided for each query, or suggestion for new query... Therefore, when those functions are not available in this portal, their search sessions are not successful.

In addition to the above considerable differences between the two groups, there are some minor differences in their evaluation on the interface design and navigation system of the portal.

Repeatedly, it seems that Group L has no significant problems in navigating links in the portal, whereas Group M has more problems with this function. The difference between Group L and M seems to be their different expectation for navigating system. For respondents from Group L, the navigation tools they used are very simple such as 'Back' button and Menu. In contrast, respondents from Group M might expect more navigation tools in the portal like navigation bar, navigation cues, etc... As those kinds of navigation tools are not available in the portal, these respondents then face difficulties in navigation ability.

The above discussions might indicate that Group L is more satisfied with the portal than Group M; as a result, their positive evaluations are higher than those of Group M. However, it is impossible to find out whether respondents from Group M experienced more problems than Group L or not. The reasonable explanation for these differences can be their different prospects.

4.4 Conclusion

This chapter has provided an analysis of the data obtained in this research. As there are no significant differences between two target groups: students and job seekers, their data analysis are combined in one section. Thus, the first section presents the usability problems reported by respondents. After that, comparison between less experienced and more experienced groups is presented. Finally, the discussion of the findings is provided.

CHAPTER 5: CONCLUSION AND RECOMMENDATION

This final chapter of the thesis presents conclusions about the research questions and hypotheses. Next, recommendations for improvement are presented. Finally, suggestions for further research are offered.

5.1 Revision on Research Questions and Hypotheses

5.1.1 Research Questions

As the aim of this study is, firstly, to investigate the usability problems of searching information in Bazar, secondly, on the basis of the investigation, recommendations for improvements are determined; the research questions stated in Section 2 have been addressed.

Research Question 1: *What usability problems do users experience when using Bazar during their information seeking process?*

On the whole, a number of usability problems were indicated through the respondents' evaluation and the browsing log. These problems are identified as portal design, organization system, searching system, labeling system and language support.

First of all, the portal design issues include the difficulty in scanability, layout consistency and the poorness in graphics. Second, the organization has problems itself when the categories of menu is too long and the hierarchy is not logical. This makes the portal not easy to browse and requires more time and effort from respondents to check out all options to get right information. The search function is the next problem when it only allows searching in labels or titles, not in the content of documents. As there is no suggestion for related keywords or query, the search function seems useless with 'incorrect' keywords. Without being ranked by relevance, the searching results, presented in alphabetical order in the mixture of many languages also cause difficulty to respondents when trying to get desired information. Another issue is poor navigational capabilities. As the portal does not provide any navigation tools to identify the current location of respondents in the portal or the links they have visited. In other words, people easily get lost in the portal. Finally, the most significant problem of the portal as

manifest through respondent reports is language support. The mixture of language between English and Norwegian always exists even when a preferred language is chosen. It is not possible for respondents to select the language of the actual resources, only the language of the labels of the links that leads to the resources. The limitation of language problems has a strong influence on the portal usability. As languages are not well supported, respondents have been limited themselves in reading, understanding and using information.

Research Question 2: *Is there any difference between less experienced users and more experienced users in their usability problems?*

The findings indicate that these two groups have different points of view in evaluating portal usability. Generally, the most significant differences are in information hierarchy and search function of the portal. The respondent groups' experiences of the interface design and the navigation system of the portal have some minor differences and they almost have the same opinion when evaluating the other factors of usability.

However, it is surprising that, in the beginning, it was expected that with more experience, the 'more experienced' group might have a higher success rate to access to information. However, in most of the cases, their positive evaluations are all lower than those of the 'less experienced' group.

5.1.2 Hypotheses

As can be seen from the discussion in Chap 4 (4.3.1 & 4.3.2), hypotheses H1, H2, H3, H4, H5, H6, H7 are tentatively supported. The final hypothesis H8 is difficult to see if it is accepted or rejected, as there is no evidence for identifying and comparing their usability problems. The only conclusion could be made is the less experienced respondents seemed more satisfied with the portal usability than the more experienced respondents.

5.2 Recommendation

5.2.1 Appearance

According to Huang (2003), when the webpage is designed with a relatively high screen resolution, respondents who have low-resolution devices can only view the webpage with one section at a time. In contrast, when webpage is designed with a relatively low resolution, there will be many blanks or/and unused spaces on a screen in a relatively high-resolution device. As this problem also occurs in Bazar portal (4.1.2), the portal interface design needs to be designed with a medium resolution that allows most of the page to be view at one screen or, even better, uses dynamic interface components which can automatically adjust their size to fit in a particular display device.

Another factor that affects viewing is the location of the menu. According to Hudson (2004), the menu of the portal should be located on the left hand side of the page. Moreover, graphic should be used to make the portal looks lively, as recommended by some respondents.

5.2.2 Organization

As pointed out by Gullikson et al (1999), Uddin and Janecek (2007), there are various approaches for organizing information.

- Semantic topic
- Organizational structure
- Spatial location
- Chronology
- Function
- User group
- Frequency of use

As the findings show that division between main subjects and sub-subjects are not logical and the menu not balanced between menu items (4.2.2). The menu items should be re-organized. The proposed structure could be seen as Figure 11.

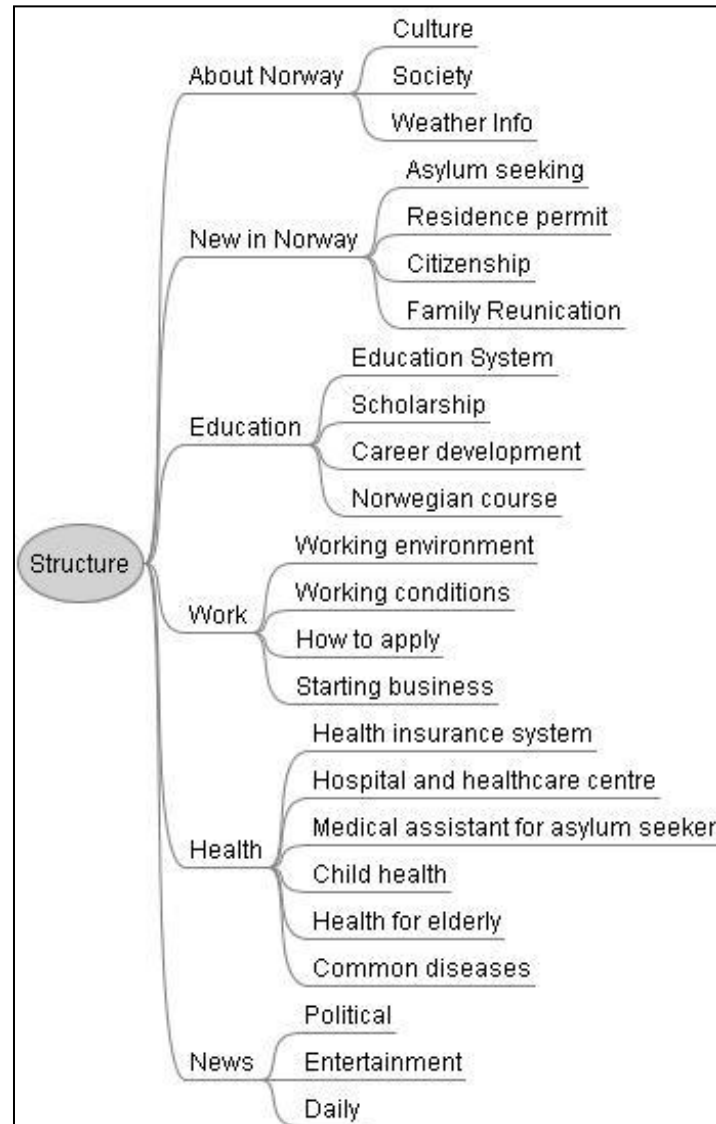


Figure 10: Proposed Information structure of the portal

Figure 10 shows the proposed information structure. In this structure, information is groups in different topics, each topic covers some related subjects.

Moreover, Uddin and Janecek (2007) also stated that users tend to prefer searching results that are organized into predictable, multidimensional hierarchies of categories. These authors also

found that a well-balanced information architecture using metadata that integrates navigation and searching into a single interface is needed for effective navigation. Therefore, to ensure that users can access information resource efficiently, each facet should be related to others by a mutually hierarchies, and each document should be classified into each of these hierarchies. With these new suggestions, each document will have at least one related topic, purpose, type of person, and area. Consequently, each document can be found under each of these facets.

5.2.3 Accessibility

a. Searching system

As searching is one of the most important functions for users to access right information, the searching system should be improved.

The findings indicate that many respondents have difficulties in searching by keywords. Therefore, to improve the searching function, the keyword directory should be provided. This directory could lists out the keywords used for information provided in the portal. Another way is listing of the most popular keywords, which have been used for searching in the portal. During the searching process, related keyword suggestion based on users' query should be available to support users.

Secondly, Boolean Searching should be supported in the search query, as Boolean searching is a powerful technique that can narrow the search to a reasonable number of results, and increase the chance of those results being useful. Boolean searches are simple to use but tremendously effective.

Furthermore, as the searching result of Bazar is a very long list with no ranking, it could be improved by sorting out the results in the decreasing order of relevance. This might help users pick the results that suites their needs best.

b. Portal index

Portal index can also be considered as another searching tool. According to Gullikson et al (1999), an alphabetical index of all pages should be used for guiding users. From this function, users may find necessary information by recognizing the concepts (p. 302).

Even there is no significant problem with the Bazar portal index has been found out by respondents; however, it is not in good format with very long list and the keywords do not cover all the topics in the portal. Thus, it still needs some improvements as follows:

- Using common topics that are predictable for users.
- Using alphabetical order. Words starting with a particular character should be separated in one page. Figure 11 is an example for a good index (<http://www.norway.no>). Words of a character are presented in one page and also sorted out in alphabetical order.

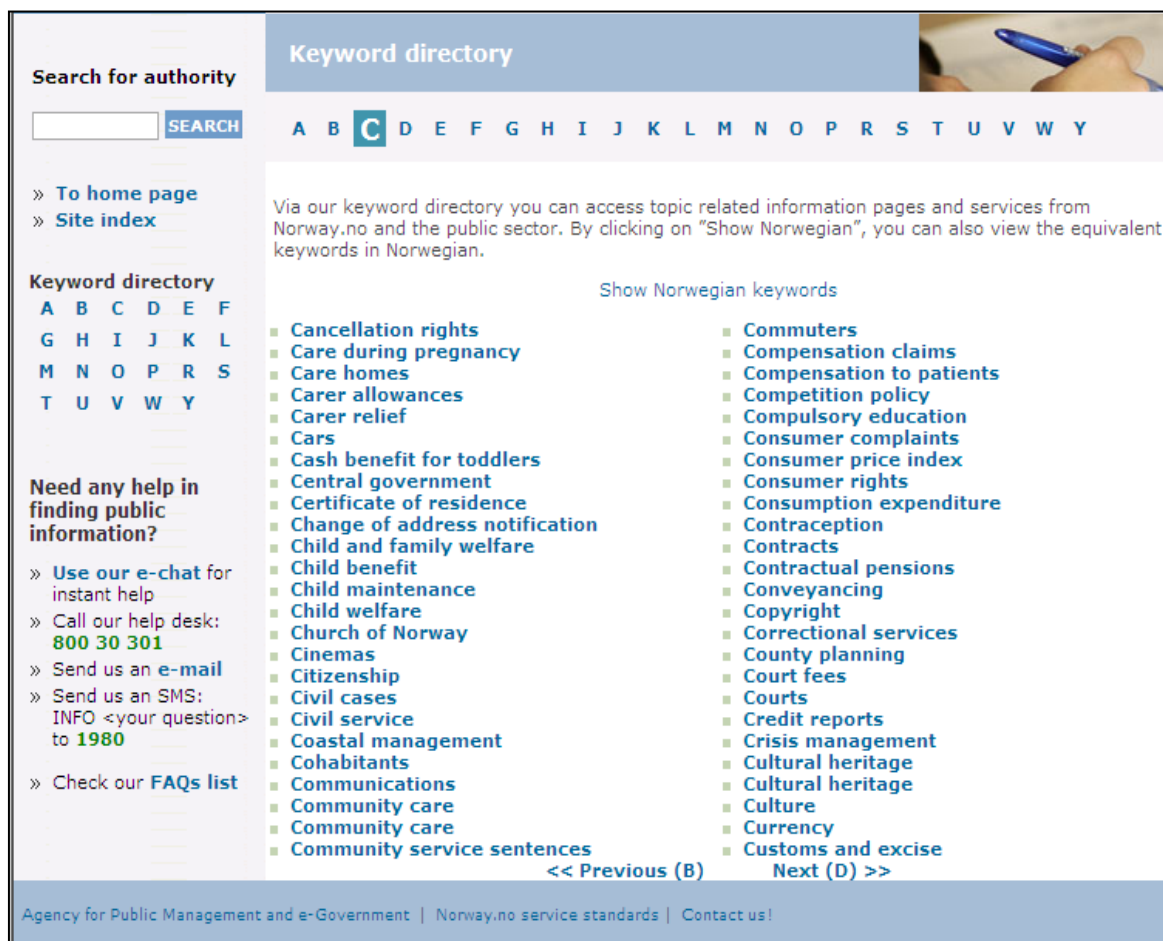


Figure 11: Example of portal index

5.2.4 Navigability

In fact, the portal does not provide any navigation tools. As the portal is organized quite simple and easy to move between pages to pages, therefore, most of respondents do not find out any problems relating to navigability. However, the navigation system of the portal could be improved as the following rules, as pointed out by Tarafda and Zhang (2005):

- Provide meaningful hyperlinks that make it easy for users to navigate around different parts of the website.
- Provide contextual links, i.e. back and forward arrows that help users understand where they have previously been and where they can go from there present position, i.e. navigation routes. Figure 12 is an example for a good navigation tool (<http://www.finfo.dk>). The navigation route is provided; make it easier for users to identify their location in the portal.



Figure 12: Example of navigation route

- Provide a summary of the website structure in terms of various web pages and their linkages so that users can know the overall organization of the website. i.e site map, topic index...

Figure 13 is an example of a topic index from Norway portal (<http://www.norway.no>). In this index, different topics are groups under related subjects.

<ul style="list-style-type: none"> ■ Community care <ul style="list-style-type: none"> ■ Financial support ■ Home and care services ■ Consumer rights ■ Employment <ul style="list-style-type: none"> ■ Employees ■ Employers ■ Jobseekers ■ Family matters <ul style="list-style-type: none"> ■ Bereavement ■ Child and family welfare ■ Inheritance ■ Living together ■ Names and people ■ Parents and children ■ Health <ul style="list-style-type: none"> ■ Health services ■ Healthy living ■ Patients ■ Housing and property <ul style="list-style-type: none"> ■ Buying property ■ Moving home ■ Planning and construction ■ Renting property ■ Legal matters <ul style="list-style-type: none"> ■ Compensation claims ■ Courts ■ Free legal aid ■ Police and crime prevention 	<ul style="list-style-type: none"> ■ Recreation, culture and the environment <ul style="list-style-type: none"> ■ Cultural heritage ■ Environmental issues ■ Leisure and recreation ■ Schools and education <ul style="list-style-type: none"> ■ Adult learning ■ Compulsory education ■ Higher education ■ Upper secondary education ■ Social security <ul style="list-style-type: none"> ■ Pensions and benefits ■ Society and civic duties <ul style="list-style-type: none"> ■ Passports and identification ■ Public administration and policy ■ Religion and beliefs ■ Voting ■ Taxation <ul style="list-style-type: none"> ■ Business tax ■ Personal tax ■ Trade and Industry <ul style="list-style-type: none"> ■ Business activities ■ Setting up business ■ Travel and transport <ul style="list-style-type: none"> ■ Travellers ■ Vehicles
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Figure 13: Example of topic index

Figure 14 is an example of a Sitemap from Sweden portal (<http://www.sweden.se>). This site map provides a very clear structure of the portal.

Site map		
HOME Facts about Sweden Sustainability blog Music room Film room Weather Sweden facts About Sweden.se Open skies, open minds QUICK FACTS Sweden in brief Famous Swedes Fact sheets News & weather About Sweden.se Social feeds FAQ LIFESTYLE Culture Music room Hip hop Classical music Dance/electronics Jazz Blog: Nils Berg - The Stoner Rock/metal/punk Pop/rock/Indie Blog: Sofia Jannok Blog: Shout Out Louds Blog: Peter Bjorn and John Folk music Pop-CD - Sweden Wants You to Dance Film room Dance Fashion Design Art Literature Theater Architecture Sustainability Sustainability blog Facing the future Food & drink Swedish culinary classics Traditions Celebrating the Swedish way	TOURISM Weather FAQ WORK Labor market Work permit legislation Family migration Salary and standard of living A good life Taxation Swedish business sectors Corporate social responsibility Regulated professions Business culture Employee rights The collective rights of employees The Work Environment Act Labor law Anti-discrimination laws Swedish trade unions Trade union services History of Swedish trade unions Contact a trade union The Swedish system What is the "Swedish Model"? Taxes and society For the common good Residence-based benefits Health care Dental care Benefits for families with children Guarantee pension Elderly care Employment-based benefits Sick leave payment Parental leave Unemployment pay Employment-based pension The Swedish education system Ages 1-5 — preschool Age 6 — preschool class Ages 7-16 — compulsory schooling Ages 16-19 — high school Age 18 and above — university etc An open society Success stories Life in Sweden	Get a job Find an open position Sweden's labor shortage list Regulated professions Start up a business Get to know Sweden CV, cover letter and interview Regulated professions — list Labor shortage — list Get a permit Move to Sweden Accommodation Typical Swedish housing Rental accommodation Buying a house or apartment Real estate agents Home owner's insurance Relocation agencies Occupant's rights Arrange children's school or daycare Ages 1-5 Age 6 Ages 7-16 Ages 16-19 Age 18 and above Grade compatibility First language instruction Living costs What to bring Arrive in Sweden Arrival Your first days in Sweden Learning Swedish Links to Swedish authorities BUSINESS Economy CSR Business culture FAQ EDUCATION Preschool Basic education Higher education & research Swedish language FAQ About Sweden.se

Figure 14: Example of Site map

5.2.5 Labeling

Based on the problems reported from respondents with the labeling system, it could be seen that, in order to improve the labeling system, labels should be explicitly related to the concept that it presents, be unambiguous and be written in the language of the users.

As the labels describing the topics of Bazar sometimes do not seem to correspond with the users' idea of the same concepts, several entries should be used for one topic to link to the resources.

As the multilingual language support is the most significant problems in the portal, it requires a lot of attention for enhancement. The problem with the current Bazar seems to be the confusion of uncompleted translation. Only the languages of labels, not their documents, are translated to a preferred language. Thus, an improvement should be taken not only in translating labels, but also in

the resource content. Whenever users chose the preferred language, information should be shown in that language: including labels, descriptions and internal content.

Being a multilingual portal, language is significant factors for the quality of the portal. If the resource is only in Norwegian; the portal seems to lose its value. Therefore, the multilingual function should be as well supported as possible.

5.2.6 Interactivity

Whenever having difficulties, user all tend to look for Frequently Asked Questions (FAQ), thus FAQ could become a defined and well-understood cyber genre (Gullikson et al, 1999). In other words, users always expect that there should be FAQ in the website.

At present, Bazar does not provide FAQ. The only option provided is Help. However, it is in Norwegian only. Therefore, to support the searching process as well as saving time for users, there should be an FAQ list in the portal. This FAQ could be for the whole information of the portal, or for a single topic. Figure 15 is an example of FAQ from Sweden portal (<http://www.sweden.se>).



Figure 15: Example of Frequent Asked Question

Another way for supporting users is Help and Support function, in which users can contact the provider directly for their queries. When asking for this supporting function, most respondents agree that there should be some ways to contact to or ask for help from the provider.

There are some ways for supporting users could be used in 'Help and Support' function:

- Help desk telephone line
- Help desk e-mail service
- Help desk e-chat service
- Help desk SMS



Figure 16: Example of help function

5.3 Implications for Further Research

As usability is highly contextual and depends on the specific interaction between the user and the Website (Maclaughlin and Skinner, 2000), Tarafdar and Zhang (2005) suggested that the users' needs are different from expertise levels and cultures. In this context, there are a number of interesting ways in which this study can be further expanded.

Firstly, as a multilingual portal, the main purpose of Bazar is serving all people that look for information about Norway from different groups such as students, job seekers, asylum seekers, librarians, or other professional users...etc. According to Sears, Jacko and Dubach (2000), there is a need to consider website usability from the point of view of different cultural and social contexts. Hence, it will be interesting to find out if there are any different aspects of assessment in usability of the portal from different users groups with different nationalities, not only limited to Vietnamese students and job seekers.

Secondly, as the findings of this study indicate, there are differences between less experienced group and more experienced group. However, the sample is not adequate for generalizing to the entire population. In a previous study, Ellis and Kurnianwan (2005) found out that different kinds of users have different notions of usability. Thus, it could be more compelling to find out if different points of view from different levels of users still exist in a larger population. This also could be a good background for website designers to design a website which adapts to the 'made for the medium' rule (Agarwal & Venkatesk, 2002).

Finally, this study only focuses on the information structure and design aspects. However, the information resource or content is also considered as one of the most significant factors for website usability (Schneider, 1998, Nielsen, 2000, Palmer, 2002, Agarwal & Venkatesk, 2002, Richard, 2005). Therefore, it would be beneficial to see how content affects the portal usability.

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APPENDICES

Appendix 1: Sample Email Request to participant recruitment

RE: Participating in evaluating the usability of Bazar portal

Dear everyone,

Firstly, I would like to introduce myself as Nga Quynh Nguyen, an master student from Digital Library Learning course, a part of the European Comission's Erasmus Mundus progamme.

As I am doing my master thesis on evaluation of the usability of Bazar portal, I'm looking for your assistance to participate in my usability test and evaluation.

Bazar (<http://bazar.deichman.no>) is the portal of Oslo public library, built to provide the practical information for people who already or coming to Norway for different purposes: studying, working, living...

The purpose of this evaluation is improving the ease of use and suggest some recommendation for the reconstruction of new version of Bazar portal.

In this usability test, people will use Bazar portal doing some tasks designed for each group. During this progress, your interaction with the portal will be recorded to support for detail analyses of how the portal performs. Based on the experience you have with the portal, you will later answer the questionnaire about the portal (English and Vietnamese are all allowed). The feedback from users during these tests will help me to find where the portal work well and where it needs improvement.

Would you be interested in participating in such a test? If so, please fill out the form and send it back to me.

I am looking forward to receiving your form. Thank you very much for your time and support in the future. If you have any questions, please let me know.

Sincerely,

Nguyen Quynh Nga

Appendix 2: Tasks for student groups

You are student coming to Norway for studying purpose. You would like to find any related information for your study. Please do the following tasks to find your information using Bazar portal, try to use search function or help and support if you cannot find the information.

a. Find out information about education system in Norway

- University and college list
- Master and PhD programs

b. Find information about textbooks for learning Norwegian

c. Find a link to information about the Erasmus Mundus scholarship in Norway

d. Find a link to information about applying for a visa for study purpose

e. Find information about housing in Norway

- Student house, dormitory
- Apartment

f. Find information about life in Norway

- Monthly average living expense - Transportation: Public transports, private transport, car license

g. Find general information about health care in Norway.

- Information about where to get health care in emergency case
- Information about dental care

h. Find information about how many hours student can work per week

Appendix 3: Task for job seeker groups

You are looking for a job in Norway and intend to come to Norway for working and living. You would like to find any related information about Norway for your purpose. Please do the following tasks to find your information using Bazar portal, try to use search function or help and support if you cannot find the information.

a. Find general information about Norway

- Climate
- Population of Norway
- When is Easter holiday in Norway

b. Information about visa for working purpose

c. Information for accommodation

- Renting a house
- Buying a house

d. Information about public transport, driver license

e. Information for working condition

- Pay
- Working environment
- Holidays
- Tax
- Social Insurance
- Unemployment benefits
- Retirement

f. Information in law on marriage

g. Find information about textbooks for learning Norwegian

h. Information about general information about health care for elder

i. News in Norway by Vietnamese

Appendix 4: Online Questionnaires

1) Which information did you find out after doing the given tasks?

- ☐ General information about Norway
 - ☐ Information about visa for working purpose
 - ☐ Information for accommodation
 - ☐ Information about public transport, driver license
 - ☐ Information for working condition
 - ☐ Pay
 - ☐ Working environment
 - ☐ Holidays
 - ☐ Tax
 - ☐ Social Insurance
 - ☐ Unemployment benefits
 - ☐ Retirement
 - ☐ Information in law on marriage
 - ☐ Find information about textbooks for learning Norwegian
 - ☐ Information about general information about health care for elder
 - ☐ News in Norway by Vietnamese
-

2) How would you rate the following?

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongl y agree
Ease of use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Well-designed interface	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ease of finding/browsing information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3) How would you rate the overall appearance of the portal?

Very Poor Good Very

	Poor			good
Font	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Color	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Menu	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Image	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Layout (groups, scroll bar...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4) It is easy to locate information you are looking for...

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
from the same text type, font and color	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
by skimming through the presented information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5) The portal provides...

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
Well-organized subject	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Logical level of information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good menu order	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6) Which kind of organization way do you prefer?

- ☐ Alphabetical
 - ☐ Geographical
 - ☐ Tasks (Groups of information in one topic)
 - ☐ User groups
 - ☐ Other, please specify
-

7) The portal provides...

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongl y agree
Understandable titles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effective multilingual support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understandable description to links	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good translation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8) What suggestion do you have to improve organization system (Both English and Vietnamese answers are accepted)

9) It is easy to find out...

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongl y agree
Shortcut to previous page	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Where you are now	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Link(s) you visited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Related links to topic you are	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

looking at

The appropriate links for
information you want

☐☐☐☐☐☐

Where to get help and support

☐☐☐☐☐☐

Available functions (choosing
language)

☐☐☐☐☐☐

10) What suggestion do you have to improve navigation system? (Both English and Vietnamese answers are accepted)

11) It was easy to locate the right information by using

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongl y agree
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Search function

☐☐☐☐☐☐

Portal Index

☐☐☐☐☐☐

12) Please rate the following

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongl y agree
--	----------------------	----------	----------------------	-------------------	-------	--------------------

The search results match your query

☐ ☐ ☐ ☐ ☐ ☐

The portal index provides meaningful keywords

☐ ☐ ☐ ☐ ☐ ☐

13) What suggestion do you have to improve searching system (Both English and Vietnamese answers are accepted)

14) The portal provides...

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
Supportive HELP function	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Useful support tools	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15) Do you think there should be a way to communicate with the provider or other users?

- ☐ Yes
☐ No

16) If yes, which one do you prefer? (You can choose more than one)

- ☐ Forum
☐ Online Q&A
☐ Email
☐ Other, please specify

17) How many years experience do you have in using internet to search information

- ☐ Less than 1 year
 - ☐ 1-3 years
 - ☐ 3-5 years
 - ☐ More than 5 years
-

18) Please provide us your IP address? (You can go to www.whatismyip.com to get your IP address)

Appendix 5: Example of log data

IP add	Date	Time	From	To	Keywords	Subjects
80.14.129.157	20.apr.10	10:01:47	/?language=9&category=297	200 http://bazar.deichman.no/	-	
80.14.129.157	20.apr.10	10:02:39	/?language=9&category=294	200 http://bazar.deichman.no/?language=9&category=297	-	Culture
80.14.129.157	20.apr.10	10:03:04	/?action=about	200 http://bazar.deichman.no/?language=9&category=294	-	About
80.14.129.157	20.apr.10	10:03:08	/?language=9&category=297	200 http://bazar.deichman.no/?action=about	-	Home
80.14.129.157	20.apr.10	10:03:12	/?language=9&category=241	200 http://bazar.deichman.no/?language=9&category=297	-	Employment
80.14.129.157	20.apr.10	10:03:34	/?language=9&category=257	200 http://bazar.deichman.no/?language=9&category=241	-	Unemployed
80.14.129.157	20.apr.10	10:07:11	/?action=about	200 http://bazar.deichman.no/?language=9&category=257	-	About
80.14.129.157	20.apr.10	10:07:13	/?language=9&category=297	200 http://bazar.deichman.no/?action=about	-	home
80.14.129.157	20.apr.10	10:08:06	/?language=9&category=297	200 http://bazar.deichman.no/?language=9&category=297	universit\xc3\xa9	home
80.14.129.157	20.apr.10	10:08:15	/?language=9&category=297	200 http://bazar.deichman.no/?language=9&category=297	university	home
80.14.129.157	20.apr.10	10:08:44	/?language=9&category=295	200 http://bazar.deichman.no/?language=9&category=297	-	Organization
80.14.129.157	20.apr.10	10:09:06	/?language=9&type=organisation&category=294	200 http://bazar.deichman.no/?language=9&category=295	-	Culture
80.14.129.157	20.apr.10	10:09:15	/?language=9&type=organisation&category=297	200 http://bazar.deichman.no/?language=9&type=organisation&category=294	-	Home
80.14.129.157	20.apr.10	10:09:23	/?language=9&type=organisation&category=292	200 http://bazar.deichman.no/?language=9&type=organisation&category=297	-	LesNorsk
80.14.129.157	20.apr.10	10:09:34	/?language=9&type=organisation&category=2473	200 http://bazar.deichman.no/?language=9&type=organisation&category=292	-	Learning Norwegian'
80.14.129.157	20.apr.10	10:09:37	/?language=1&category=296	200 http://bazar.deichman.no/?language=9&type=organisation&category=2473	-	Bibliotek
80.14.129.157	20.apr.10	10:09:48	/?language=1&category=294	200 http://bazar.deichman.no/?language=1&category=296	-	Culture
80.14.129.157	20.apr.10	10:09:51	/?action=about	200 http://bazar.deichman.no/?language=1&category=294	-	About
80.14.129.157	20.apr.10	10:09:53	/?language=9&category=297	200 http://bazar.deichman.no/?action=about	-	home
80.14.129.157	20.apr.10	10:10:12	/?language=9&category=297	200 http://bazar.deichman.no/?language=9&category=297	education	home
80.14.129.157	20.apr.10	10:10:19	/?action=index&language=1	200 http://bazar.deichman.no/?language=9&category=297	-	index
80.14.129.157	20.apr.10	10:10:34	/?action=index&language=1	302 http://bazar.deichman.no/?action=index&language=1	-	
80.14.129.157	20.apr.10	10:10:34	/?action=index&language=9	200 http://bazar.deichman.no/?action=index&language=1	-	index in French